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NOTICE TO AMERICAN READERS.

Complete series of the Journal may be had of Messrs. D. Appleton and Co., 200, Broadway, New York, to whom all subscriptions for the United States, after the 10th of January, 1851, must be paid.

NOTICES.

Subscribers who have not paid their subscriptions in advance are requested to remit 6s. in discharge of the half year now expired, or 11s. for the current year.

The subscription is 10s. per annum if paid in advance, or 12s. on credit, payable in two sums of 6s. each, due in June and December of each year. All subscriptions commence from the 10th of January.

All communications and orders for Advertisements to be addressed to the Editor, 32, Bucklersbury, London.

Back numbers exceeding three months' date will in future be charged double price, unless six or more consecutive numbers are taken at the same time. Nos. 6 and 18 are out of print.

The Editor will be particularly obliged by his friends forwarding to him Notices of all Meetings, Trials, or Appeals which it may be interesting to the Gas World to have reported.

ERRATA.

In the Circular to Gas Companies for May, 1851, *for* M. Tilboucher *read* M. Th. Boucher. *For* Haldane and Roe *read* Haldane and Rae.

Circular to Gas Companies.

The Editor may be consulted on all subjects connected with the supply and manufacture of gas, or the alteration and improvement of gas apparatus, and the construction of new works.

In our last month's hasty survey of the contents of the Crystal Palace, numerous nooks and corners in which manufactured articles connected with the distribution of gas were concealed, escaped our observation, and each successive visit reveals some fresh collection. The first edition of the catalogue, far from aiding research, was a positive hindrance; and the only alternative was to throw it away, and search for oneself, without a guide, through the eighteen miles of corridors and galleries. Many lots are still without a number or the name of the exhibitor, and it is, therefore, impossible to say by whom they are exhibited. This is the case with a magnificent gilt drawing-room chandelier, in which a porcelain vase is very happily introduced, and also with some brackets remarkable for their superior design. They are to be found over the articles of a Birmingham carriage-lamp manufacturer, and are, we presume, from that town. Messrs. D. Hulett and Co.'s goods are among the best exhibited. They comprise gas-cooking apparatus suited for the peer or the peasant, Rutter's ventilating pendent, hall lamps, a variety of excellent gas-fittings, and, not the least worthy of notice, a contrivance for heating italian-irons by gas. Their adaptation of a sand-glass to an experimental meter, as a measurer of time, is likely to be of good service to gas engineers in their observations upon the consumption of burners. Joseph Hill's stamped ornaments for gas-fittings show that considerable richness of design may be introduced at a small cost. The French have employed such for many years, and we are glad to see them introduced here. Lloyd and Sumerfield's glass chandeliers are very effective; and T. Hale and Co., of Bristol, have some tolerable samples of brackets and chandeliers. Huxley, Heriott, and Co. have lately sent in some gas stoves and fittings; and Deane, Dray, and Deane, one of the cheap cylindrical stoves. Two more gilt candelabra, of gigantic proportions, have just been exposed in the Russian department. In design they may rank with anything of their class in the Exhibition, and the workmanship shows a high state of perfection; indeed, so much so that we are inclined to believe the heads that designed and the hands that modelled them, are more Parisian than Russian. Messrs. C. Whitehouse and Co.'s tubes escaped our previous survey. The time has not yet come when a catalogue raisonné can be made of all the collection contains in relation to our art, but it is probable we may be able to give one next month.

The same may be said of the exhibition of gas apparatus at the Polytechnic Institution, which now begins to assume an attractive form. We have heard complaints of so few of the apparatus being shown in actual operation; but we believe arrangements are made by which the gentleman who has been engaged to explain them, will put any into operation which a visitor may request.

The projected amalgamation of the metropolitan water companies can scarcely be carried this session in the face of the opposition which it has raised; nor is it, in our opinion, one conceived in the spirit of the times. It lacks that popular control without which all large bodies are hunted down as monopolists, and of which the effect is demonstrated in those towns where the gas works are in the hands of trustees for the public, who willingly pay 10 per cent. more for the article they purchase from themselves than their neighbours pay with grumbling to irresponsible trading bodies. Had a representative from the city of London and each of the metropolitan boroughs been added to the twelve directers proposed to be chosen by the shareholders it would have disarmed some of the opposition which in its present state it will encounter. The following are some of the principal provisions of the proposed bill, which, after reciting that the nine existing water companies henceforward to form one company, and to have one common stock, goes on to enact that

"The capital of the company shall consist of a consolidated capital stock of an amount equal to the aggregate of the several sums of such stock, to be allotted as hereinafter mentioned to the said companies to be dissolved under this act, and shall be considered as paid-up stock, and be divided among the persons and corporations constituting the said metropolitan water company as hereinafter provided.

"Such sum of the said consolidated capital stock as shall be determined by arbitration, as hereinafter mentioned, to be the just price or consideration for the waterworks, land, machinery, property, and rights of each of the said companies to be dissolved, shall be allotted to such respective com-

pany; and the amount of such stock to be alloted to each company shall be determined by arbitration, to be made between the commissioners of her Majesty's Treasury and each company separately, with all convenient speed after the passing of this act, according to the provisions of the 'Land Clauses Consolidation Act, 1845,' applicable to the settlement by arbitration of questions of disputed compensation, such provisions being for the purposes of this act read as if the commissioners of her Majesty's Treasury were substituted therein for the promoters of the undertaking (the costs of every such arbitration to be borne by the Metropolitan Water Company); and the sums of capital stock of the said Metropolitan Water Company allotted as aforesaid to the said companies respectively shall be the property of the persons or corporations who on the said *thirtieth day of September one thousand eight hundred and fifty-one* shall be shareholders in the said companies, rateably in proportion to the number of shares in the said companies held by them respectively."

The company to be regulated by twelve directors holding at least £2000 stock. The shareholders not to receive more than five per cent. dividend on the capital stock, until the rates are reduced to such a sum as will be named in the schedule, when it may be increased to six per cent., which is to be the maximum dividend. Power to be reserved if Parliament should decide upon Government taking the whole of the works; then the company is to sell their stock at £125 per £100 stock.

"The company shall with all convenient speed do all acts necessary for affording to the houses supplied by them a constant supply of water for domestic purposes; provided always, that it shall not be incumbent on the company to afford a supply of water to any house in which the pipes, cocks, cisterns, machinery, and arrangements of all kinds for the reception and distribution of water shall not be constructed and maintained agreeably to the regulations which the company, with the approval of the said Secretary of State, may, by their by-laws as herein provided, make in that behalf; and provided also that the said company may, with the approval of the said Secretary of State, suspend the giving such constant supply, or give the same in such succession to the different districts supplied with water by the company as they may judge expedient.

"The company shall provide and keep constantly laid on, unless prevented by unavoidable accident or during necessary repairs, a sufficient supply of water for the following purposes (that is to say), for cleansing the sewers and drains, for cleansing and watering the streets, and for supplying public baths and washhouses, and for such other purposes conducive to the preservation of the public health of the inhabitants of the metropolis, as one of her Majesty's principal Secretaries of State may from time to time direct; and such supply shall be provided at such rates, in such quantities, and upon such terms and conditions as the commissioners of her Majesty's Treasury may direct."

Our provincial readers will be surprised to learn that, after many repeated failures, there is at length some prospect of the amalgamation of the City of London and Great Central Consumers' Companies. If we were to credit all the rumours on the subject which reach us, we should have to report it as a *fait accompli*. From the best information we can obtain, we believe the bases are understood between the parties, but the details are so difficult to deal with that, notwithstanding every disposition of the parties to carry the measure into effect, it may, after all, be abandoned as impracticable. Should this be the result of the negotiations, the Great Central Company may yet have to admit the impossibility of fulfilling the promises they have held out to the public and their shareholders, upon the strength of which they have struggled into existence. Our principal regret, if it take place, is, that the true position of the company will be thereby for ever smothered, and a new lease of power to misrepresent taken by its concoctors. Six months longer would have brought matters to a crisis. We have it already admitted that the whole of the subscribed capital is expended, and large liabilities unliquidated; that the rental is only £30,000 a year, instead of upwards of £50,000, which was calculated upon, and the following advertisement, extracted from the *Times* of the 24th ult., is evidence, in the absence of other which we could give, that the powers of the 26-inch main, and other parts of the apparatus, are already taxed up to their utmost limits:—

"GREAT CENTRAL GAS CONSUMERS' COMPANY.

"The board of directors of this company will meet on Monday, the 9th of June next, at four p.m., for the purpose of receiving tenders for the following works:—Two telescopic gasholders, 105 feet in diameter by 52 feet, with necessary cast-iron guide-framing; four wet lime purifiers, 15 feet diameter, 3 feet deep, with all necessary driving machinery; one double vertical condenser, 40 feet long, 23 feet high, 5 feet wide; one 10-horse high pressure and condensing steam-engine; 4350 yards of 36-inch cast-iron pipes, in 12-feet lengths; 400 yards of 24-inch cast-iron pipes in 12-feet length, together with other works. Plans and specifications may be seen at the offices of the company, 28, Coleman-street, City, on and after Tuesday, the 27th inst., by applying to Mr. A. A. Croll.

We can, therefore, understand why every opportunity, whether appropriate or not, was made subservient to keeping up a delusive appearance of prosperity, and how even a demand for assistance in carrying out a contract for public lights, taken from their opponents, might be made the vehicle for the renewal of a negotiation, over and over again abandoned. We regret, on public grounds, that the protection of the interests of the shareholders in the City Gas Company has forced upon its directors the necessity of listening, at the present time, to any renewal of the proposals, though there can be no doubt that it is to the interest of each body to terminate their present hostilities by an honourable and lasting peace.

Forty-eight members, out of above two hundred, comprising the Corporation of the city of London, voted, on the 13th ult., for the prostitution of their corporate seal, by affixing it to a petition to Parliament in favour of a trading company. Most of those forty-eight members are among the most clamorous denouncers of the spoliation and confiscation about to be inflicted on themselves, by the suppression of Smithfield Market without compensation to the sufferers by the change. They ought to read a great moral lesson in the present position of that question. The same arms which they unsheathed at the bidding of a clique of speculators have been turned against themselves; and, after having raised an outcry against monopoly, they are, in their turn, the victims of their own example in aidting and abetting a similar cry and becoming partisans in a private job. They may also learn that corporations are not less fallible than companies, and that both may sometimes hold out too long. The gas companies have been charged with not yielding in time; the Corporation of the city of London may be twitted with having refused the offer of being entrusted with the management of the new markets wherever they may be erected, an offer which, if now repeated, would, it is understood, be accepted. These reflections ought to lower the tone of the forty-eight corporators who, in showing their strength, have not proved that might is either right or justice, or that a tyrant majority can escape from its share of retributive justice.

The evidence in the arbitration between the Great Central Company and its contractors closed without any further reference to the report of a partnership existing between Mr. Croll and Mr. Pearson, alluded to in our last. It will be seen, however, from our parliamentary summary, that it was to some extent admitted, though an actual partnership was denied. What construction the authorities at Westminster or Basinghall-street might put upon a connection of the nature admitted to exist is another question, which, we trust, will not come before them; but there is no doubt now that in this agitation Mr. Pearson was not so disinterested as was supposed, and that our strictures on the hypothetical case put are actually merited by the acknowledgment of the reality of the fact alleged.

Mr. Warren, the superintendent of the Chartered Gas Company's works at Westminster, has invented a very accurate method of reading off pressures, by which they may be measured to the hundredth part of an inch. Such an instrument will be of great utility in experimental researches upon the flow of gas through mains, or on the consumption of burners under certain pressures, and generally in all cases where it is of consequence to ascertain the pressure with mathematical accuracy.

Communicated Articles.

SOME OBSERVATIONS AND EXPERIMENTS UPON THE COMPARATIVE VALUE OF COALS FOR THE MANUFACTURE OF GAS.

BY THOMAS G. BARLOW, C.E.

(*Continued from page* 65.)

These figures differ so widely from those of some other experimentalists of acknowledged ability and standing, and throw such suspicion over the accuracy of the methods adopted for determining the illuminating power of gases, as to discredit all similar experiments. Some of the differences may be due to the large consumpt of the burners used, as it is a well-established fact that the illuminating power of Newcastle coal gas increases progressively as the quantity consumed by an argand burner is augmented; and it is, therefore, requisite in all *comparative* experiments that equal volumes of gas should be consumed in equal times, in such burners as are found best adapted to the combustion of the respective gases. It will be seen, however, by the following experiments, that some other disturbing causes must have operated to produce the startling results alluded to, and I suspect they will be found in the vapour of naphtha given off by the hydro-carbons deposited in an apparatus principally used for experiments upon rich cannel coals, the interior of which must be saturated with deposits from previous distillations.

An esteemed friend has favoured me with the report of some experiments lately made by himself upon Pelton coal under conditions nearly similar to my own, and they so tend to corroborate my results as to warrant their introduction here:—

Cubic feet of gas per ton of coal.	Consumpt per hour.	One cubic foot of gas equal to grains of sperm.	Value of the gas from one ton of coal in lbs. of sperm.
Winfield's argand, (registered July 25, 1848); 28 holes in a ring $\frac{17}{20}$ inch diameter. Chimney $7\frac{1}{2}$ inch long, slightly conical.			
11·500 made, but only 9·500 retained	6·90	341·	462·
9,450	6·75	321·6	435·
10,200	6·98	288·2	420·
		Mean ..	439·
Common 15-hole argand.		Chimney $6\frac{1}{2}$ high.	
11,500 made, but only 9,500 retained	6·12	272·8	370·
9,450	5·90	279·8	377·
10,200	6·09	263·	383·
		Mean ..	376·6

It will be remarked that my average value of the gas from one ton of this coal, when consumed in an argand burner at the rate of 5 feet per hour, was only 422 lbs. of sperm candles; it, however, becomes 439 lbs. in the above experiments, when consumed in a superior burner in larger quantities, and was reduced to 376·6 lbs. by a 15-hole argand, the holes of which were too small for the profitable combustion of this description of gas. Dr. Fyfe's last-published report quotes the mean value of a cubic foot of this gas as equal to 468 grains of sperm, with a consumpt of 5·5 feet per hour in an improved argand burner, upon a yield of 9746 cubic feet of gas per ton, and this gives 637 lbs. of sperm candles as the value of the gas from one ton of these coals, being nearly 51 per cent. above the results of my experiments.

Anxious to unravel, if possible, the mystery of such an extraordinary discrepancy, I determined to go through a series of carefully-conducted experiments upon the different burners in general use for Newcastle coal gas; and, with this object, I requested the loan of the burner used by Dr. Fyfe in his late experiments, a request which he, with that spirit which ever distinguishes the disinterested searcher after truth, at once complied with. The gas used for these trials was that supplied to the public by the City of London Gas Company, being extracted, on the days when they took place, from a mixture of Pelton, Felling, and Dean's Primrose coals, all first-class Newcastle gas coals, differing in no respect in the quality or quantity of the gas they yield when treated under similar circumstances, and, consequently, equal for all practical purposes. The average produce at these works is stated to be 8500 feet of gas per ton of coal.

The burners used were—

1st. A No. 3 fish-tail, or union jet.

2nd. A No. 5 batswing.

3rd. A common argand, with fifteen large holes in a ring ·85 in. diameter, and a cylindrical chimney-glass 7 in. high.

4th. A Platow's registered (Nov. 2, 1840) argand, with sixteen large holes in a ring ·9 in. diameter, with inside and outside cone, and cylindrical chimney-glass 8·5 in. high.

5th. A Bynner's patent No. 3 argand, with twenty-eight medium-sized holes in a ring ·75 in. diameter, and cylindrical chimney-glass 8·65 in. high.

*6th. A Winfield's registered (March 20, 1845) argand, with fifty-eight medium-sized holes in two rings of twenty-nine holes in each, the mean diameter being 1 in., with deflecting button inside, and gauze below; bellied chimney-glass 8 in. high.

7th. A Leslie's patent argand, with twenty-eight jets in a ring ·95 in. diameter, and chimney-glass 3·5 in. high.

8th. A Guise's registered (May 2, 1849) shadowless argand, with twenty-six large holes in a ring ·85 diameter, and deflecting button; cylindrical chimney-glass 6·1 high, and glass reflecting-cone to outside gallery.

On an average of numerous trials (in the first series of which I was assisted by a gentleman who has witnessed many of Dr. Fyfe's experiments), the following results were obtained :—

SERIES No. 1.

Burner.	Consumpt per hour.	Value of 1 cubic foot in grains of sperm.	Standard candles per cubic foot.	Value of 8500 feet of gas in lbs. of sperm.
No. 2.	4·0	289·	2·4	351·
No. 3.	5·5	343·	2·85	416·
No. 5.	5·5	374·	3·11	447·
No. 6.	5·5	337·	2·8	409·
No. 8.	5·5	350·	2·91	425·

SERIES No. 2.

No. 1	5·5	276·	2·3	335·
No. 2	5·0	290·	2·41	352·
No. 3	5·5	341·	2·84	414·
No. 4	5·5	348·	2·9	422·
No. 5	5·5	380·	3·16	461·
No. 6	5·5	335·	2·79	406·
No. 7	4·1	369·	3·07	448·
No. 8	5·5	364·	3·03	442·

* This is the burner used by Dr. Fyfe in his experiment, and called by him the Aberdeen argand.

It is quite evident from these experiments that the No. 6 or Dr. Fyfe's Aberdeen argand required a larger consumpt than 5·5 feet per hour to bring out the full effect of Newcastle coal gas of the quality used in this case; but, being anxious to repeat his experiments exactly as given by himself, I have recorded those only in which the consumpt did not exceed the quantities stated in his. I must, however, remark that, when the consumpt of No. 6 burner was increased to 6·5 feet per hour, it gave results equal to any of its compeers, at 5·5 feet. No. 2 and No. 7 burners were tried with the utmost quantity which could be consumed in them without smoking or burning disadvantageously.

Though these experiments indicate the relative adaptation of the several burners for the combustion of Newcastle coal gas, they must not be taken as settling the question of the practical value of each. Some of them cast shadows which detract considerably from the light they yield when placed above the level of the eye; this is particularly the case with No. 5, which otherwise gives the best results. Others, like No. 7, require a perfect uniformity of pressure, and an absence of all currents of air. Taking all things into consideration, No. 8 is, perhaps, the one to which these objections least apply, and it gives the next largest amount of light for the gas consumed, though the slight advance upon the old argand, as constructed twenty-five years since, cannot fail to be remarked; and I maintain that my standard of 422 lbs. of sperm for the gas produced from one ton of Newcastle coal when consumed in an old-fashioned 15-hole argand burner, with a consumpt of 5 feet per hour, is demonstrated by these experiments to be as near to perfect accuracy as such observations are capable of. The burners I have used are at the service of any gas engineer desirous of repeating my experiments.

The next material to which I shall allude is one recently discovered, but, being that by which cannel coal gas was successfully introduced into the metropolis, it merits attention. The Newcastle cannel is at present worked only to a limited extent, and was, till lately, regarded as a worthless splint. It yields less gas than the Wigan, though of far higher illuminating power, as will appear from a comparison of the following experiments :—

EXPERIMENT No. 5.
NEWCASTLE CANNEL.
Charge 2·24 lbs., at a good heat.

Time occupied in the distillation of each foot.			Total time occupied in the distillation of the successive feet.		
Min.	Sec.	One foot.	Min.	Sec.	Successive feet.
2	27	1·			
2	33	1·	5	0	2·
2	58	1·	7	58	3·
3	15	1·	11	13	4·
3	35	1·	14	48	5·
4	4	1·	18	52	6·
4	23	1·	23	15	7·
5	0	1·	28	15	8·
7	15	1·	35	30	9·
5	25	·5	40	55	9·5
14	15	·5	55	10	10·

PRODUCTS.
10,000 feet of gas per ton,
1,400 lbs. of coke ,,
65 lbs. of tar ,,
40 lbs. of ammoniacal liquor.

Each cubic foot of this gas, when burnt in a No. 2 London fish-tail burner, was equal to 596 grains of sperm; hence 10,000 × 596 ÷ 7000 gives the illuminating value of the gas from one ton of this coal, when consumed in the manner indicated above, as equal to 851 lbs. of sperm candles.

The standard jet gave a flame $3\frac{6}{10}$ in. long with 1 in. pressure.

EXPERIMENT No. 6.
NEWCASTLE CANNEL.
Charge 2·24 lbs., at a moderate heat.

Time occupied in the distillation of each foot.			Total time occupied in the distillation of the successive feet.		
Min.	Sec.	One foot.	Min.	Sec.	Successive feet.
2	55	1·			
2	46	1·	5	41	2·
3	15	1·	8	56	3·
3	46	1·	12	42	4·
9	40	2·	22	22	6·
5	21	1·	27	43	7·
6	17	1·	34	0	8·
7	22	1·	41	22	9·
4	38	5·	47	0	9·5

PRODUCTS.
9,500 feet of gas per ton,
1,440 lbs. of coke ,,
90 lbs. of tar ,,
80 lbs. of ammoniacal liquor.

Each cubic foot of the gas, when burnt in a No. 2 London fish-tail burner, was equal to 590 grains of sperm; hence 9500 × 590 ÷ 7000 gives the illuminating value of the gas from one ton of

this coal, when consumed in the manner indicated above, as equal to 800 lbs. of sperm candles.

The standard jet gave a flame $3\frac{8}{10}$ in. long with 1 in. pressure.

Experiment No. 7.
Newcastle Cannel.
Charge 2·24 lbs., at a high heat.

Time occupied in the distillation of each foot. Min. Sec.	One foot.	Total time occupied in the distillation of the successive feet. Min. Sec.	Successive feet.
2 14	1·		
2 19	1·	4 33	2·
2 40	1·	7 13	3·
3 3	1·	10 16	4·
3 26	1·	13 42	5·
3 30	1·	17 12	6·
4 16	1·	21 28	7·
4 30	1·	25 58	8·
5 25	1·	31 23	9·
3 18	·5	34 41	9·5
4 2	·5	38 43	10·

Products.

10,000 feet of gas per ton,
1,440 lbs. of coke „
140 lbs. of tar „
60 lbs. of ammoniacal liquor.

Each cubic foot of the gas, when burnt in a No. 3 London fish-tail burner, was equal to 632 grains of sperm; hence 10,000 × 632 ÷ 7000 gives the illuminating value of the gas from one ton of this coal, when consumed in the manner indicated above, as equal to 902 lbs. of sperm candles.

The standard jet gave a flame of $3\frac{4}{10}$ in. long with 1 in. pressure.

The average value of this coal, as indicated by these experiments, is—

Cubic feet of gas per ton of coal.	One cubic foot of gas equal to grains of sperm.	Consumption per hour of a burner equal to 12 standard candles.*	Value of the gas from one ton of coal in lbs. of sperm.
9833	606	2·37 cubic ft.	851

I am, however, assured by parties who have used this cannel to a considerable extent, that by distilling it at a lower temperature, and limiting the quantity to 8500 feet per ton, a gas equal to 780 grains of sperm per foot can be obtained. This would raise the value of the gas from one ton to nearly 920 lbs. of sperm; but, as I have not been able to repeat the experiment myself, I cannot personally affirm it, and the above trials are rather against such a mode of testing it.

Wigan cannel, to which I shall next refer, is a material which has long and deservedly enjoyed a high reputation with the gas engineers of Lancashire, and the spirited offer of the London and North-Western Railway Company to convey it along their lines at a half-penny per ton per mile has brought it within the reach of the gas works of the midland and metropolitan districts, where it is now extensively employed in improving the quality of gas extracted from Midland and other coals. The following experiments give it a respectable rank among the English coals; and, as its existence has been proved below a large surface, and there is considerable competition amongst the various owners, little fear need be entertained of any material increase in the current prices:—

Experiment No. 8.
Wigan Cannel (Ince-hall).
Charge 2·24 lbs., at a very high heat.

Time occupied in the distillation of each foot. Min. Sec.	One foot.	Total time occupied in the distillation of the successive feet. Min. Sec.	Successive feet
1 30	1·		
1 30	1·	3 0	2·
1 45	1·	4 45	3·
1 55	1·	6 40	4·
2 15	1·	8 55	5·
2 40	1·	11 35	6·
2 55	1·	14 30	7·
3 40	1·	18 10	8·
5 5	1·	23 15	9·
8 0	1·	31 15	10·
5 35	·5	37 10	10·5
17 55	·5	55 5	11·
9 35	·15	64 40	11·15

Products.

11,150 feet of gas per ton,
1,295 lbs. of coke „
230 lbs. of tar „
185 lbs. of ammoniacal liquor.

Each cubic foot of the gas, when burnt in a Winfield argand burner, was equal to 465.8 grains of sperm; hence 11,150 × 465.8 ÷ 7000 gives the illuminating value of the gas from one ton of this coal, when consumed in the manner indicated above, as equal to 742 lbs. of sperm candles.

The standard jet gave a flame $2\frac{8}{10}$ in. long with 1 in. pressure.

Experiment No. 9.
Wigan Cannel (Ince-hall).
Charge 2·24 lbs., at a high heat.

Time occupied in the distillation of each foot. Min. Sec.	One foot.	Total time occupied in the distillation of the successive feet. Min. Sec.	Successive feet.
1 50	1·		
2 0	1·	3 50	2·
2 20	1·	6 10	3·
2 45	1·	8 55	4·
3 45	1·	12 10	5·
3 40	1·	15 50	6·
4 10	1·	20 0	7·
4 50	1·	24 50	8·
5 20	1·	30 10	9·
7 10	1·	37 20	10·
28 10	1·	1 5 30	11·
20 30	·4	1 26 0	11·4

Products.

11,400 feet of gas per ton,
1,350 lbs. of coke „
245 lbs. of tar „
180 lbs. of ammoniacal liquor.

Each cubic foot of the gas, when burnt in a Winfield argand burner, was equal to 408.7 grains of sperm; hence 11,400 × 408.7 ÷ 7000 gives the illuminating value of the gas from one ton of this coal, when consumed in the manner indicated above, as equal to 665 lbs. of sperm candles.

The standard jet gave a flame $2\frac{8}{10}$ in. long with 1 in. pressure.

Experiment No. 10.
Wigan Cannel (Ince-hall).
Charge 2·24 lbs., at a moderate heat.

Time occupied in the distillation of each foot. Min. Sec.	One foot.	Total time occupied in the distillation of the successive feet. Min. Sec.	Successive feet.
2 33	1·		
2 47	1·	6 20	2·
3 11	1·	9 31	3·
3 20	1·	11 51	4·
3 26	1·	15 17	5·
3 34	1·	18 51	6·
3 52	1·	22 53	7·
4 28	1·	27 11	8·
6 2	1·	33 13	9·
21 55	1·	55 8	10·

Products.

10,000 feet of gas per ton.
1,350 lbs. of coke „
270 lbs. of tar „
120 lbs. of ammoniacal liquor.

Each cubic foot of the gas, when burnt in a No. 2 London fish-tail burner, was equal to 523 grains of sperm; hence 10,000 × 523 ÷ 7000 gives the illuminating value of the gas from one ton of this coal, when consumed in the manner indicated above, as equal to 747 lbs. of sperm candles.

The standard jet gave a flame $2\frac{8}{10}$ in. long with 1 in. pressure.

The average value of this coal, as indicated by these experiments, is—

Cubic feet of gas per ton of coal.	One cubic foot of gas equal to grains of sperm.	Consumption per hour of a burner equal to 12 standard candles.	Value of the gas from one ton of coal in lbs. of sperm.
10·850	465.8	3·09 cubic ft.	718

The best mode of treating Wigan cannel is a subject upon which the Lancashire gas engineers are not agreed, one school maintaining that 10,000 feet is the maximum quantity which can be extracted from it without serious damage to the quality; and the other, that it may be safely extended to 12,000 feet per ton. The most favourable conditions for its combustion seem to be in a fish-tail burner, with a flame rather below its full extent, a "lazy flame," as it has been termed, such as will be given with $\frac{4}{10}$ pressure, when $\frac{6}{10}$ would be required to produce the full light. I have before me some interesting experiments made by Alfred King, Esq., the engineer of the Liverpool United Gas Company, with a variety of burners, in which Wigan cannel gas was consumed in quantities varying from one to five feet per hour, rising half a foot each time, and the general results fully bear out this view.

These experiments form but a small instalment of the series by which the Faraday of English gas engineers has constantly sought to arrive at a knowledge of every condition required for the full development of the qualities and properties of gas; and no one who has been privileged with an opportunity of inspecting the means by which accuracy is ensured, or has witnessed the scru-

* At the suggestion of an esteemed friend I have changed this column from the quantity of light given by the combustion of a fixed quantity of gas to the hourly quantity of gas required to give a standard light equal to twelve 120-grain per hour sperm candles.

pulous care with which every experiment is conducted by him, will for an instant doubt that they represent the true value of Wigan cannel gas when generated and consumed under the circumstances stated. No document on this question has yet come before me which so ably tells its own tale, or tends to reconcile the apparently discordant results of various experimentalists; and I cannot too strongly or sincerely express my thanks to Mr. King for his permission to allow me to refer to it, nor for his readiness at all times to throw the store of lucidly-arranged and laboriously-detailed results of his experience open to his brethren in the profession; and I am sure that my own are but the echo of their unanimous acknowledgments.

I need only cite a few instances to show how nearly Mr. King's experiments corroborate my own and others. He states that the illuminating power of each foot of Wigan gas consumed in a No. 2 London fish-tail burner, with a consumpt of 3 feet per hour, was equal to 467·5 grains of sperm. My experiments give 465·8 grains as a mean. Dr. Fyfe found that, on a consumpt of 5 feet per hour in a Winfield argand (called by him the Aberdeen argand), each foot was equal to 459·2 grains, while Mr. King states it as 452·3 in a burner by the same maker, but differing from the other in some respects in its construction. The consumpt in Dr. Fyfe's second experiment with his argand burner is not stated, and I apprehend it was so large as to disturb the average of his trials; but it is evident that, so far as Mr. King's, Dr. Fyfe's, and my own experiments on Wigan cannel gas *run parallel*, they confirm each other, though, for reasons before stated, I disagree with the doctor widely in his value of Pelton gas, and hence, also, in his comparative value of Wigan and Pelton coals.

Mr. King's experiments indicate in a lucid and concise form, clearer than a volume on the subject can express, the manner in which Wigan gas may be consumed to the greatest advantage, and how admirably adapted gas of this quality is for general use, where a light equal to 10 or 12 candles or less is required, and more especially for public lights, from the fact that fish-tail burners are best suited for its combustion, whereas inferior gas is consumed in them and in batswings to a great disadvantage. This explains the reason why the price of public lights is generally so low in the cannel coal districts compared with what it is in the districts using caking coal, 14,000 feet of gas sufficing for a public light burning all the year round in the former, whereas at least 25,000 feet are required in the latter.

Experiments on the Illuminating Power of Wigan Cannel Gas, by Alfred King, Esq.

Single Jet.

	1 foot.
Consumpt per hour ..	1·01
1 foot = candles.....	2·68
1 foot = grains of sperm	321·8

Lancashire Fish-tail No. 0.

	1 foot.	1½ foot.
Consumpt per hour ..	1·005	1·48
1 foot = candles.....	2·19	2·04
1 foot = grains of sperm	263·3	244·9

Lancashire Fish-tail No. 1.

	1 foot.	1½ foot.	2 feet.
Consumpt per hour ..	1·	1·5	1·995
1 foot = candles.....	2·7	2·93	3·78
1 foot = grains of sperm	325·	351·6	453·5

Lancashire Fish-tail No. 2.

	1 foot.	1½ foot.	2 feet.
Consumpt per hour ..	1·	..	2·
1 foot = candles.....	3·36	..	3·39
1 foot = grains of sperm	403·3	..	407·1

Lancashire Fish-tail No. 3.

	1 foot.	1½ foot.	2 feet.	2½ feet.	3 feet.	3½ feet.
Consumpt per hour ..	1·	1·5	2·	2·5	3·	3·5
1 foot = candles.....	3·69	3·99	3·61	3·62	3·58	3·39
1 foot = grains of sperm	443·6	478·7	433·6	434·4	429·8	407·1

Lancashire Fish-tail No. 4.

	1 foot.	1½ foot.	2 feet.	2½ feet.	3 feet.	3½ feet.	4 feet.
Consumpt per hour ..	1·	1·5	2·	2·5	3·	3·5	4·
1 foot = candles.....	3·69	4·19	3·63	3·72	3·73	3·63	3·7
1 foot = grains of sperm	443·6	502·7	437·4	446·5	447·4	437·3	444·8

London Fish-tail No. 2.

	1 foot.	1½ foot.	2 feet.	2½ feet.	3 feet.	3½ feet.	4 feet.
Consumpt per hour ..	1·	1·5	2·	2·5	3·	3·502	4·
1 foot = candles.....	3·49	4·14	3 61	3·77	3·89	3·73	3·85
1 foot = grains of sperm	418·9	497·7	433·6	452·5	467·5	447·9	461·8

Batswing.

	1 foot.	1½ foot.	2 feet.	2½ feet.	3 feet.	3½ feet.	4 feet.	4½ feet.	5 feet.
Consumpt per hour ..	1·	1·5	2·	2·5	3·	3·5	4·	4·5	5·
1 foot = candles.....	3·18	3·39	3·45	3·61	3·79	4·	3·76	4·02	3·93
1 foot = grains of sperm	381·7	467·7	412·6	433·2	454·3	479·8	451·2	483·	471·4

Sixteen-hole Argand, small holes in ring, 0·82 in diameter.

	1 foot.	1½ foot.	2 feet.	2½ feet.	3 feet.	3½ feet.	4 feet.	4½ feet.	5 feet.
Consumpt per hour ..	1·	1·5	1·99	2·5	3·	3·5	4·	4·5	5·
1 foot = candles.....	0·2	0·93	1·58	2·43	2·59	2·98	3·22	3·48	3·68
1 foot = grains of sperm	23·7	111·6	190·0	291·8	311·9	357·7	386·8	417·5	442·

Winfield's Twenty-eight-hole Argand, registered July 25, 1848, with slightly Conical Chimney.

	1 foot.	1½ foot.	2 feet.	2½ feet.	3 feet.	3½ feet.	4 feet.	4½ feet.	5 feet.
Consumpt per hour ..	1·	1·48	2·	2·49	3·	3·495	4·	4·5	5·
1 foot = candles.....	0·2	0·92	1·82	2·46	2·68	3·02	3·3	3·68	3·77
1 foot = grains of sperm	23.4	110·6	219.3	295·9	321·8	362.5	395·9	442·1	452·3

The coal to which I shall next refer is one of the many low qualities of Scotch cannel, with which the coal districts of that country abound. It is of the same character as those known by the names of Lumphinan, Skaterig, Breadisholme, Bartons-hill, &c., the inferior quality of which has frustrated all attempts to introduce them into remote markets, and confined their use to the local ones, where, by admixture with higher-priced rich cannels, they are capable of being economically employed. Large quantities have, however, been of late poured into the London market, under the belief that anything called "Scotch cannel" would find a ready sale; and some nefarious tricks have been attempted by mixing them with first-class cannels, and selling the whole as the genuine production of some well-known first-class colliery.

Experiment No. 11.

Lochgelly Cannel.

Charge 2·24 lbs., at a high heat,

Time occupied in the distillation of each foot. Min. Sec.	One foot.	Total time occupied in the distillation of the successive feet. Min. Sec.	Successive feet.
2 35	1·		
2 40	1·	5 15	2·
2 50	1·	8 5	3·
3 3	1·	11 8	4·
3 17	1·	14 25	5·
3 25	1·	17 50	6·
4 29	1·	22 19	7·
6 54	1·	29 13	8·
8 47	·5	38 0	8·5
1 30	·063	39 30	8·563

Products.

8,563 feet of gas per ton,
1,230 lbs. of coke „
240 lbs. of tar „
340 lbs. of ammoniacal liquor.

Each cubic foot of the gas, when burnt in a No. 2 London fish-tail burner, was equal to 427 grains of sperm; hence 8563 × 427 ÷ 7000 gives the illuminating value of the gas from one ton of this coal, when consumed in the manner indicated above, as equal to 522 lbs. of sperm candles.

The standard jet gave a flame $3\frac{2}{10}$ in. long with 1 in. pressure.

Experiment No. 12.

Lochgelly Cannel.

Charge 2·24 lbs., at a moderate heat.

Time occupied in the distillation of each foot.		Total time occupied in the distillation of the successive feet.	
Min. Sec.	One foot.	Min. Sec.	Successive feet.
3 35	1·		
3 10	1·	6 45	2·
3 16	1·	10 1	3·
3 29	1·	13 30	4·
3 51	1·	17 21	5·
4 4	1·	21 25	6·
4 46	1·	26 11	7·
11 42	1·	37 53	8·
3 22	·1	41 15	8·1

Products.

8,100 feet of gas per ton,
1,260 lbs. of coke „
210 lbs. of tar „
340 lbs. of ammoniacal liquor.

Each cubic foot of the gas, when burnt in a No. 2 London fish-tail burner, was equal to 451 grains of sperm; hence 8100 × 451 ÷ 7000 gives the illuminating value of the gas from one ton of this coal, when consumed in the manner indicated above, as equal to 522 lbs. of sperm candles.

The standard jet gave a flame $3\frac{2}{10}$ in. long with 1 in. pressure.

The average value of this coal, as indicated by these experiments, is—

Cubic feet of gas per ton of coal.	One cubic foot of gas equal to grains of sperm.	Consumption per hour of a burner equal to 12 standard candles.	Value of the gas from one ton of coal in lbs. of sperm.
8331	439	3·28 cubic ft.	522

The preceding experiments embrace the *principal* varieties of coal most largely used in the manufacture of gas in the United Kingdom; but the higher class of Scotch cannels still remains for me to examine. This class includes the Boghead, Old Wemyss, Kirkness, Capeldrae, Lesmahago, Arniston, Monkland, Lothian, and a few others not so well known as those enumerated. Few of them are used alone in Scotland, but in combination with second or third class cannels, such as the Lochgelly; and there is no doubt that some might be beneficially imported into England to be used in a similar manner with inferior coals. Unfortunately the coke from them is of little value; that from the Boghead is worthless as fuel, though its composition seems to indicate the possibility of applying it to other uses, of which I may have occasion to say more hereafter; that from the Lesmahago has some value; but this general defect is in a measure compensated by the large quantity of valuable tar produced from this class of cannels, which is converted into naphtha, and, being an article in current demand, is saleable at a remunerating price. The naphtha of Dundee is extensively sold in the London market, and bears a high character.

The Boghead cannel can be scarcely called a coal: the German word by which such formations are known signifies a "resinous earth," and this more correctly describes its character. When first discovered, doubts were expressed as to whether it could be obtained in sufficient quantities to allow it to be profitably worked, but, as it has been proved to extend over upwards of 2000 acres, the doubt is now definitively set at rest. The seam varies from eighteen to twenty inches thick. It is massive, without any defined cleavage, and the fracture is conchoidal—thus establishing its character as a true cannel. The following experiments fully bear out those of Dr. Fyfe and Dr. Penny upon this singular material:—

Experiment No. 13.

Boghead Cannel.

Charge 2·24 lbs., at a moderate heat.

Time occupied in the distillation of each foot.		Total time occupied in the distillation of the successive feet.	
Min. Sec.	One foot.	Min. Sec.	Successive feet.
5 25	4·		
1 28	1·	6 53	5·
1 39	1·	8 32	6·
1 48	1·	10 20	7·
1 57	1·	12 17	8·
2 4	1·	14 21	9·
2 13	1·	16 34	10·
1 10	·5	17 44	10·5
1 14	·5	18 58	11·
1 19	·5	20 17	11·5
1 28	·5	21 45	12·
1 42	·5	23 27	12·5
2 20	·5	25 47	13·
8 50	·5	34 37	13·5

Products.

13,500 feet of gas per ton,
710 lbs. of coke „
780 lbs. of tar „
No ammoniacal liquor.

Each cubic foot of the gas, when burnt in a No. 1 London fish-tail burner, was equal to 1097 grains of sperm; hence 13,500 × 1097 ÷ 7000 gives the illuminating value of the gas from one ton of this coal, when consumed in the manner indicated above, as equal to 2115 lbs. of sperm candles.

The standard jet gave a flame $3\frac{4}{10}$ in. long with 1 in. pressure.

Experiment No. 14.

Boghead Cannel.

Charge 2·24 lbs., at a low heat.

Time occupied in the distillation of each foot.		Total time occupied in the distillation of the successive feet.	
Min. Sec.	One foot.	Min. Sec.	Successive feet.
2 25	1·		
1 57	1·	4 22	2·
2 4	1·	6 26	3·
2 12	1·	8 40	4·
2 18	1·	10 56	5·
2 24	1·	13 20	6·
2 32	1·	15 52	7·
2 35	1·	18 27	8·
2 50	1·	21 17	9·
3 16	1·	24 33	10·
4 29	1·	29 2	11·
6 27	·5	35 29	11·5
6 5	·132	41 34	11·632

Products.

11,632 feet of gas per ton,
715 lbs. of coke „
720 lbs. of tar „
No ammoniacal liquor.

Each cubic foot of the gas, when burnt in a No. 1 London fish-tail, was equal to 1275 grains of sperm; hence 11,632 × 1275 ÷ 7000 gives the illuminating power of the gas from one ton of this coal, when consumed in the manner indicated above, as equal to 2126 lbs. of sperm candles.

The standard jet gave a flame $3\frac{8}{10}$ in. long with 1 in. pressure.

Experiment No. 15.

Boghead Cannel.

Charge 2·24 lbs., at a very high heat.

Time occupied in the distillation of each foot.		Total time occupied in the distillation of the successive feet.	
Min. Sec.	One foot.	Min. Sec.	Successive feet.
1 51	2·		
1 14	1·	3 5	3·
1 7	1·	4 12	4·
1 24	1·	5 36	5·
1 45	1·	6 1	6·
1 36	1·	8 37	7·
1 50	1·	10 27	8·
2 0	1·	12 27	9·
2 11	1·	14 38	10·
2 14	1·	16 52	11·
2 24	1·	19 16	12·
2 45	1·	22 1	13·
4 0	1·	26 1	14·
4 35	·5	30 36	14·5
13 35	·4	44 11	14·9

Products.

14,900 feet of gas per ton,
720 lbs. of coke „
710 lbs. of tar „
No ammoniacal liquor.

Each cubic foot of the gas, when burnt in a No. 1 London fish-tail burner, was equal to 957 grains of sperm; hence 14,900 × 957 ÷ 7000 gives the illuminating value of the gas from one ton of this coal, when consumed in the manner indicated above, as equal to 1932 lbs. of sperm candles.

The standard jet gave a flame $3\frac{2}{10}$ in. long with 1 in. pressure.

The average value of this coal, as indicated by these experiments, is consequently—

Cubic feet of gas per ton of coal.	One cubic foot of gas equal to grains of sperm.	Consumption per hour of a burner equal to 12 standard candles.	Value of the gas from one ton of coal in lbs. of sperm.
13,334	1109	1·3 cubic ft.	2057

From the above it will be seen that the gas from 100 tons of Boghead cannel contains as much illuminating matter as the undermentioned quantities of the coals previously enumerated:—

487 tons of Pelton Main.
394 tons of Lochgelly cannel.
286 tons of Wigan cannel.
or 242 tons of Newcastle cannel.

The following further experiments were made with the view of determining to what extent it might be desirable to sacrifice the Newcastle coke by mixing the two coals together and distilling them in the same retort:—

Experiment No. 16.

Mixed Coal and Cannel—¾ths Pelton and ¼th Boghead.
Charge 2·24 lbs., at a very high heat.

Time occupied in the distillation of each foot.		Total time occupied in the distillation of the successive feet.	
Min. Sec.	One foot.	Min. Sec.	Successive feet.
1 15	1·		
1 23	1·	2 38	2·
1 39	1·	4 17	3·
1 55	1·	6 12	4·
2 15	1·	8 27	5·
2 28	1·	10 55	6·
2 45	1·	13 40	7·
2 58	1·	16 38	8·
3 14	1·	19 52	9·
3 26	1·	23 18	10·
3 34	1·	26 52	11·
3 55	1·	30 47	12·
5 40	1·	36 27	13·

Products.
13,000 feet of gas per ton,
1,360 lbs. of coke „
180 lbs. of tar „
130 lbs. of ammoniacal liquor.

Each cubic foot of the gas, when burnt in a No. 2 London fish-tail burner, was equal to 493 grains of sperm; hence 13,000 × 493 ÷ 7000 gives the illuminating value of the gas from one ton of these coals (mixed in the different proportions stated) as equal to 915 lbs. of sperm candles.

Experiment No. 17.

Mixed Coal and Cannel—¾ths Pelton and ¼th Boghead.
Charge 2·24 lbs., at a good heat.

Time occupied in the distillation of each foot.		Total time occupied in the distillation of the successive feet.	
Min. Sec.	One foot.	Min. Sec.	Successive feet.
2 1	1·		
2 7	1·	4 8	2·
2 26	1·	6 34	3·
2 49	1·	9 23	4·
3 7	1·	12 30	5·
3 25	1·	15 55	6·
3 27	1·	19 22	7·
3 57	1·	23 19	8·
4 31	1·	27 50	9·
5 59	1·	33 40	10·
4 30	1·	38 10	11·
6 59	1·	45 9	12·
10 21	·5	55 30	12·5

Products.
12,500 feet of gas per ton,
1,380 lbs. of coke „
190 lbs. of tar „
120 lbs. of ammoniacal liquor.

Each cubic foot of the gas, when burnt in a No. 2 London fish-tail burner, was equal to 589 grains of sperm; hence 12,500 × 589 ÷ 7000 gives the illuminating value of the gas from one ton of these coals (mixed in the proportions stated) as equal to 1051 lbs. of sperm candles.

The standard jet gave a flame $3\frac{3}{10}$ in. long with 1 in. pressure.

Experiment No. 18.

Mixed Coal and Cannel—¾ths Pelton and ¼th Boghead.
Charge 2·24 lbs., at moderately high heat.

Time occupied in the distillation of each foot.		Total time occupied in the distillation of the successive feet.	
Min. Sec.	One foot.	Min. Sec.	Successive feet.
1 45	1·		
1 59	1·	3 44	2·
2 19	1·	6 3	3·
2 30	1·	8 33	4·
2 51	1·	11 24	5·
3 10	1·	14 34	6·
3 15	1·	17 49	7·
3 21	1·	21 10	8·
3 29	1·	24 39	9·
3 40	1·	28 19	10·
3 56	1·	32 15	11·
4 9	1·	36 24	12·
2 40	·5	39 4	12·5
5 57	·4	45 1	12·9

Products.
12,900 feet of gas per ton,
1,360 lbs. of coke „
250 lbs. of tar „
100 lbs. of ammoniacal liquor.

Each cubic foot of the gas, when burnt in a No. 2 London fish-tail burner, was equal to 577 grains of sperm; hence 12,900 × 577 ÷ 7000 gives the illuminating value of the gas from one ton of these coals (mixed in the proportions stated) as equal to 1061 lbs. of sperm candles.

The standard jet gave a flame $3\frac{1}{10}$ in. long with 1 in. pressure.

Experiment No. 19.

Mixed Coal and Cannel—¾ths Pelton and ¼th Boghead.
Charge 2·24 lbs., at a high heat.

Time occupied in the distillation of each foot.		Total time occupied in the distillation of the successive feet.	
Min. Sec.	One foot.	Min. Sec.	Successive feet.
1 15	1·		
1 16	1·	2 31	2·
1 39	1·	4 10	3·
1 50	1·	6 0	4·
2 3	1·	8 3	5·
2 9	1·	10 12	6·
2 30	1·	12 42	7·
2 53	1·	15 35	8·
3 8	1·	18 43	9·
3 9	1·	21 52	10·
3 18	1·	25 10	11·
3 28	1·	28 38	12·
2 0	·5	30 38	12·5
4 47	·5	35 25	13·

Products.
13,000 feet of gas per ton,
1,390 lbs. of coke „
175 lbs. of tar „
130 lbs. of ammoniacal liquor.

Each cubic foot of the gas, when burnt in a No. 2 London fish-tail burner, was equal to 478 grains of sperm; hence 13,000 × 478 ÷ 7000 gives the illuminating value of the gas from one ton of these coals (mixed in the proportions stated) as equal to 887 lbs. of sperm candles.

The standard jet gave a flame 3 in. long with 1 in. pressure.

In the two following experiments the coals were distilled separately and the gases mixed:—

Experiment No. 20.

¾ths Pelton and ¼th Boghead Distilled separately and the Gases Mixed.

2·24 lbs. Pelton (see Experiment No. 3)	....	9·5 feet.
·746 lbs. Boghead; time, 10 min. 20 sec.	....	5·280 „
2·986 lbs. of mixed coal produced	.....	14·780 „

Mean product per ton, 11,085 feet.

Each cubic foot of the mixed gas, burnt in a No. 2 London fish-tail burner, was equal to 556 grains of sperm; hence 11,085 × 556 ÷ 7000 gives the illuminating power of the gas from one ton of these coals (distilled separately in the proportions stated) as equal to 880 lbs. of sperm candles.

The standard jet gave a flame $3\frac{1}{10}$ in. long with 1 in. pressure.

Experiment No. 21.

¾ths Pelton and ¼th Boghead, Distilled separately, and the Gases Mixed.

2·24 lbs. Pelton (see Experiment No. 4)	....	9·5 feet.
·746 lbs. Boghead; time, 4 min. 85 sec.	....	4·850 „
2·986 lbs. of mixed coal produced	.....	14·350 „

Mean product per ton, 10,763 feet.

Each cubic foot of the mixed gas, burnt in a No. 2 London fish-tail burner, was equal to 606 grains of sperm; hence 10,763 × 606 ÷ 7000 gives the illuminating power of the gas from one ton of these coals (distilled separately in the proportions stated) as equal to 931 lbs. of sperm candles.

The standard jet gave a flame $2\frac{9}{10}$ in. long with 1 in. pressure.

The average value of a mixture of three-quarters Pelton Main and one quarter Boghead cannel, when distilled together, will be—

Cubic feet of gas per ton of coal.	One cubic foot of gas equal to grains of sperm.	Consumption per hour of a burner equal to 12 standard candles.	Value of the gas from one ton of coal in lbs. of sperm.
12,800	553*	2·6 cubic ft.	1009

And when distilled separately—

10,924	581*	2·48 cubic ft.	905

The gain by the distillation of the coals mixed together over that in separate retorts would thus appear to be about 10 per cent., an advantage which, I apprehend, would be more than counterbalanced by the deterioration in the quality of the Newcastle coke which such a process would cause.

The effect produced by the mixture of Boghead with inferior cannels has yet to be considered. Here the objection to mixing them in the retort can scarcely be said to exist, as the entire coke

* These are considerably superior to Wigan cannel gas, but inferior to that from Newcastle cannel.

from these cannels is nearly worthless. The following experiments were made with this view:—

Experiment No. 22.

Mixed Cannels—⅞ths Lochgelly and ⅛th Boghead.

Charge 2·24 lbs., at a moderate heat.

Time occupied in the distillation of each foot. Min. Sec.	One foot.	Total time occupied in the distillation of the successive feet. Min. Sec.	Successive feet.
2 19	1·		
2 41	1·	5 0	2·
2 46	1·	7 46	3·
3 14	1·	11 0	4·
3 32	1·	14 32	5·
3 55	1·	18 27	6·
4 24	1·	22 51	7·
5 45	1·	28 36	8·
11 14	1·	39 55	9·
5 75	·055	45 25	9·055

Products.

9,055 feet of gas per ton,
1,200 lbs. of coke „
400 lbs. of tar „
170 lbs. of ammoniacal liquor.

Each cubic foot of the gas, when burnt in a No. 2 London fish-tail burner, was equal to 695 grains of sperm; hence 9055 × 695 ÷ 7000 gives the illuminating value of the gas from one ton of these coals (mixed in the proportion stated), when consumed in the manner indicated above, as equal to 899 lbs. of sperm candles.

The standard jet gave a flame $3\frac{8}{10}$ in. long with 1 in. pressure.

Experiment No. 23.

Mixed Cannels—$\frac{9}{10}$ths Lochgelly and $\frac{1}{10}$th Boghead.

Charge 2·24 lbs., at a moderate heat.

Time occupied in the distillation of each foot. Min. Sec.	One foot.	Total time occupied in the distillation of the successive feet. Min. Sec.	Successive feet.
2 44	1·		
3 1	1·	5 45	2·
3 25	1·	9 10	3·
3 38	1·	12 48	4·
4 16	1·	17 4	5·
4 26	1·	21 30	6·
6 0	1·	27 30	7·
9 15	1·	36 45	8·
10 0	·5	46 45	8·5

Products.

8,500 feet of gas per ton,
1,210 lbs. of coke „
390 lbs. of tar „
240 lbs. of ammoniacal liquor.

Each cubic foot of the gas, when burnt in a No. 2 London fish-tail burner, was equal to 600 grains of sperm; hence 8500 × 600 ÷ 7000 gives the illuminating value of the gas from one ton of these coals (mixed in the proportions stated), when consumed in the manner indicated above, as equal to 728 lbs. of sperm candles.

The standard jet gave a flame $2\frac{8}{10}$ in. long with 1 in. pressure.

Experiment No. 24.

Mixed Cannels—$\frac{9}{10}$ths Lochgelly and $\frac{1}{10}$th Boghead.

Charge 2·24 lbs., at a good heat.

Time occupied in the distillation of each foot. Min. Sec.	One foot.	Total time occupied in the distillation of the successive feet. Min. Sec.	Successive feet.
2 28	1·		
2 30	1·	4 58	2·
2 43	1·	7 41	3·
2 58	1·	10 39	4·
3 16	1·	13 55	5·
3 31	1·	17 26	6·
3 53	1·	21 19	7·
4 55	1·	26 14	8·
7 40	1·	33 54	9·
10 18	·5	44 12	9·5
1 44	·1	45 56	9·6

Products.

9,600 feet of gas per ton,
1,200 lbs. of coke „
280 lbs. of tar „
340 lbs. of ammoniacal liquor.

Each cubic foot of the gas, when burnt in a No. 2 London fish-tail burner, was equal to 600 grains of sperm; hence 9600 × 600 ÷ 7000 gives the illuminating value of the gas from one ton of these coals mixed in the proportions stated) as equal to 820 lbs. of sperm (candles.

The standard jet gave a flame $3\frac{2}{10}$ in. long with 1 in. pressure.

Experiment No. 25.

Mixed Cannels—$\frac{11}{12}$ths Lochgelly and $\frac{1}{12}$th Boghead.

Charge 2·24 lbs., at a very high heat.

Time occupied in the distillation of each foot. Min. Sec.	One foot.	Total time occupied in the distillation of the successive feet. Min. Sec.	Successive feet.
1 39	1·		
1 43	1·	3 22	2·
1 50	1·	5 12	3·
1 59	1·	7 11	4·
2 23	1·	9 34	5·
2 47	1·	12 21	6·
3 18	1·	15 39	7·
4 4	1·	19 43	8·
6 10	1·	25 53	9·
6 45	·5	32 38	9·5
5 13	·25	37 51	9·75

Products.

9,750 feet of gas per ton,
1,240 lbs. of coke „
270 lbs. of tar „
270 lbs. of ammoniacal liquor.

Each cubic foot of the gas, when burnt in a No. 2 London fish-tail burner, was equal to 443 grains of sperm; hence 9750 × 443 ÷ 7000 gives the illuminating value of the gas from one ton of these coals (mixed in the proportions stated) as equal to 617 lbs. of sperm candles.

The standard jet gave a flame of $3\frac{1}{10}$ in. long with 1 in. pressure.

If distilled *separately*, the mixture of $\frac{9}{10}$ths Lochgelly and $\frac{1}{10}$th Boghead should, by calculation, have given the following results:—

Cubic feet of gas per ton of coal.	One cubic foot of gas equal to grains of sperm.	Consumption per hour of a burner equal to 12 standard candles.	Value of the gas from one ton of coal in lbs. of sperm.
8831	495	2·9 cubic ft.	624·4

When distilled *together* the mean results were:—

9050	600	2·4 cubic ft.	774

⅞ths Lochgelly and ⅛th Boghead, distilled together, gave—

9055	695	2·07 cubic ft.	899

$\frac{11}{12}$ths Lochgelly and $\frac{1}{12}$th Boghead, distilled together, gave—

9750	443	3·25 cubic ft.	617

It would thus appear that from ⅛th to $\frac{1}{10}$th of Boghead, mixed with the low-priced cannels, will yield gas of the quality generally in use in Scotland.

(To be continued.)

THE USE AND VALUE OF AMMONIACAL LIQUOR FOR AGRICULTURAL PURPOSES.

By Mr. Edward Taylor, *Rochdale.**

Every person has observed after showers of rain how lively and green vegetation appears, and this is more observable after a thunder-shower. The showers of spring are proverbial.

If there is little rain in spring and no snow in winter the land is not so productive as if it were otherwise. A large quantity of snow compensates, in some degree, for the absence of rain; and, on the contrary, a large quantity of rain supplies the place of snow. Every farmer knows that the fertility of his land depends greatly on the quantity of snow or rain that falls in the winter or spring. How can this be accounted for? How is it that these effects are produced? It is not simply the water, of the rain or snow, which is so exhilarating and beneficial. Both rain and snow contain a substance which is called by chemists ammonia, and this is the chief agent in producing these effects.

An inquiry, then, into the origin, nature, and value of this substance, ammonia, is of considerable interest and importance to farmers and gardeners.

Ammonia is produced when any vegetable or animal matter putrefies. Thus it is formed in large quantities in dunghills, where straw or other vegetable substances are placed to decay.

The urine of animals is a great source of ammonia. It is also produced when coal or any other vegetable or animal substance is burnt in close vessels. In making gas, from coal or cannel, a large quantity of ammonia is formed and is separated therefrom by being mixed with water.

When ammonia is not mixed with acids it may be discovered by its pungent smell. Around dunghills and in stables this smell is very perceptible. Spirit of hartshorn, which is simply ammonia and water, is used, on account of its pungent smell, to fill smelling-bottles. The ammonia, when thus simply mixed, is said to be in a free state, that is, it is not in a combined, a fixed state, and when thus free it will keep flying away and mixing with the atmosphere when exposed in an open vessel.

The value of ammonia, as a promoter of vegetation, is because it affords to vegetables, one of the substances without which they cannot grow; this substance is nitrogen. Ammonia is composed of two gases, named by chemists hydrogen and nitrogen, both of

* Extracted from an interesting pamphlet on the subject, sold by Mr. Hebert, 88, Cheapside.

which gases form a part of the organic body of all plants. The air we breathe is four-fifths, in bulk or volume, of it nitrogen, but it is not from air that plants obtain the large supply of nitrogen which they require. Plants by their leaves do take up a considerable portion of their body from the atmosphere, but it is by their roots chiefly that they take up nitrogen; and in proportion as plants are supplied with manures containing nitrogen, so in proportion they grow, and it has been found by numerous experiments that the more nitrogen vegetables take up, the more of the other substances necessary for their growth are they enabled to take up, and thus the plant becomes larger and more perfect. Ammonia is the great source from whence plants derive their chief supply of nitrogen. When ammonia water is judiciously applied, it wonderfully increases the growth of grass, wheat, turnips, and, indeed, of most vegetables.

This has been tried by many farmers and chemists, and out of numerous instances we select the following cases as evidence of the beneficial action of ammonia:—

I. In the year 1841, Mr. Wilson, of Largs, in Scotland, communinated to the Philosophical Society of Glasgow an account of an experiment made by him, which was published in the *Gardeners' Chronicle*, from which we extract the following:—

"A piece of three years' old pasture, of uniform quality, I divided into ten lots of twenty perches each, old Scotch measure. All the lots were manured at the same time, on April 15th, with the articles in the following table, and the grass cut and made into hay in July:—

Lot.	—	Produce of the lot.	The rate produced per acre of hay.	Increase per acre over that left untouched.
		lbs.	lbs.	
1	Left untouched	420	3360	..
2	2½ barrels of quicklime added..	602	4816	1456
3	1 ton of lime from gas works..	651	5208	1848
4	4¼ cwt. of wood charcoal powder	665	5320	1960
5	2 bushels of bone dust.....	693	5544	2184
6	18 lbs. nitrate of potash.....	742	5936	2576
7	20 lbs. nitrate of soda.....	784	6272	2912
8	10 bushels of soot.....	819	6552	3192
9	28 lbs. sulphate of ammonia....	874	6776	3416
10	100 gals. ammoniacal liquor from gas works, at 5 Tweddle's hydrom.....	945	7562	4200

The value of each application was the same—namely, 5s., or at the rate of £2 per acre."

II. A similar experiment to the above was made, though with another purpose, by M. F. Kuhlmann, a German chemist. He tried seven manures all containing ammonia, and the result was that the ammoniacal liquor of the gas works produced more hay than four of the manures, and less than two of them. These two were "the water in which bones had been boiled" and "Flemish manure," a manure well known in Holland, but, as used by M. F. Kuhlmann, much stronger than that usually used. Though the quantity produced was less than by these two manures, yet the profit was in favour of the ammoniacal liquor by about sixteen per cent. over Flemish manure, and upwards of sixty per cent. over the other, and the outlay in cost of the ammoniacal liquor was only one-third of the amount of either. The other four manures were sal ammoniac, sulphate of ammonia, nitrate of soda, and the urine of the horse.

III. Mr. J. Watson, the manager of the gas works at Kirriemuir, is quoted in "Clegg's Treatise on the Manufacture of Coal Gas" as saying:—

"The ammoniacal liquor has been found a very great improvement as a manure for the raising crops of grass in this quarter, by being sprinkled on the field in the same way as water is put on public streets in large towns, to keep down dust in dry weather. I have myself seen an experiment of this tried, and can say that part of a field of grass sprinkled in this way (after first cutting) was far superior to any other part of the field receiving manure of any other kind, and that the part so sprinkled or showered over was ready to be cut down a second time in the course of between fourteen days or three weeks; whereas the other part of the field cut at the same time was only beginning to spring or rise from the roots in that time. It has to be mixed up before use with four parts of common water."

IV. In the *Gardeners' Chronicle* for 1843 a gentleman in Monmouthshire writes:—

"In the beginning of April I watered half a clay-land meadow, of five acres, with ammoniacal liquor, diluted with five times the quantity of clear pond water. In three days I perceived that all the moss, and many of the finer blades of grass, close to the ground were destroyed. The bulk of the herbage, however, appeared to be unaffected; but in a week's time there was a decided improvement in the portion manured; and from that time to this there has been an increased quantity and a very improved quality of grass. Its colour is darker than the other. Any stock prefer grazing on that side the meadow."

V. Mr. Joseph Butterworth, of Rochdale, has furnished me with the following statement:—

"In the spring of 1845 I put on to a portion of a meadow at my farm at Brimrod, near Rochdale, three barrels of ammoniacal liquor, which I obtained at the Rochdale Gas Works, and mixed with an equal portion of water. To apply it to the land I borrowed the watering-cart of the town commissioners, that with which the streets are watered. When the cart stopped to turn, when it was being applied, a larger quantity of the liquor ran on the land, and on these places the grass was burned and did not grow for some time, but on the other portion of the meadow where the liquor was applied the difference was seen in a short time. The grass was of a lively dark green, and was considerably higher and thicker than the other parts of the field; indeed, the difference in appearance was so great that many persons came to me to inquire as to the cause. The crop of hay was full twice as much as from that part of the field where it was not applied. Since that time I have used ammoniacal liquor on the whole of my farm."

VI. Mr. John Haworth, of Falinge, formerly of Roach House, Rochdale, in a letter to me, after describing his mode of operation on the land he held at Roach House, says:—

"Gas washings, or ammoniacal water, is a powerful manure, but cannot be used without largely diluting, otherwise it destroys the herbage. It speedily produces a dense deep foliage, rank looking, yet cattle will crop it close, as it is produced very different with a similar-looking grass the product of farmyard manure, which they will respect and pass over untouched." * * * * "Our small landholders may be timid and object to try these (Lime and Ammoniacal Water, see page 14) and all such new-fangled manures; so were their fathers, and grandfathers, and grannies before them. 'Nothing like muck,' say they, and yet they hardly ever use this article without the half of its good qualities being evaporated, to descend again, perhaps, in the next shower upon their neighbours' land."

VII. The above trials of ammoniacal liquor are on grass lands: there are many, equally satisfactory, that might be quoted in its use for grain, &c., but, as this neighbourhood is chiefly a grass district, one may be sufficient. It is from an account of an experiment published in the *Mark Lane Express*, by Sir J. M. Tylden. The experiment was upon April wheat—

"I selected two perches of similar ground adjoining each other, the soil of which was, to the depth of six inches, made up from an old bank, brought to cover a stiff loamy brick earth. It had a good crop of mangel wurzel upon it the previous autumn. No. 1. (plot) was manured with half of the following compost:—One gallon of ammoniacal gas water, half a bushel of sawdust, coal ashes, and gypsum sufficient to fix the ammonia, half a pint of gas tar, one pound of nitrate of soda, and four barrow-loads of poor rubbishy turf and weeds. In about three weeks the gas water had decomposed this mass; half of it dug in on No. 1 a few days *before* the *wheat* was planted. On No. 2 (plot) no manure of any kind was put. The wheat was dibbled in rows six inches apart, and the same distance in the rows, one or two grains at a place. Both perches came up quickly and grew well; No. 1 being stronger and of a deeper green. In a few days No. 2 was much eaten by the wireworm, which destroyed nearly half, whilst No. 1 was scarcely touched; and I think if I had applied all the compost, not a grain would have been eaten. The wheat grew rapidly, No. 1 keeping the lead and promising a heavy crop. It came into ear on the 23rd of June, and both were harvested on the 15th August, and thrashed out soon after. No. 1 yielded one gallon two quarts, and No. 2 three quarts one pint. But I am agreeably surprised at the result of the compost, which appears to destroy the wireworm at a trifling expense."

Here we close the instances we adduce of the trial of ammonia water as a manure, and it will be observed that the results of the experiments are highly satisfactory, the growth of the crops being quicker, the produce much larger, and the quality better when it was used.

A question may arise as to the best manner of using it, and the most suitable time. An exact and full answer to this question could not be given without a lengthened and careful set of experiments, but to some extent it may now be answered. From the examples quoted of its use it will be seen that if the ammonia water be used in too strong a state the effect for a considerable time is injurious—it burns the plant. It must then be diluted or or mixed with water. The most proper strength for using it would be to mix the ammoniacal liquor of the strength (three Tweddle) it is sold at the gas works with at least five times its proportion of water, or one gallon of ammonia water to five gallons of water. If it be laid on the land in wet weather, that is during a shower, it may be used stronger, about half liquor and half water; but it is not economical to use it during continued rain, as then the rain carries it lower than the roots too quickly. It should not be sprinkled on the land on a clear sunshiny day; if it be, a considerable portion of the ammonia will fly off, owing to the heat of the sun. Cloudy weather is the most fitting for its application.

A watering-cart (such as used for watering the streets of towns in dusty weather) appears to be the best contrivance yet thought of for applying it when it is used on meadow land, and for equally distributing it.

An excellent mode of using the ammoniacal liquor would be to mix it with substances that will absorb it, such as dry sawdust, dry coal ashes or sifted cinders, burned earth or clay, charcoal and the dried scrapings of roads. It can, when thus absorbed, be thrown on the land with a spade, or ploughed in.

As to the most suitable time of the year to apply the ammonia liquor. For grass lands the best time would be after the grass has begun to grow in the spring, and as late as it can be applied without injury to the growing grass from treading down; but, if if used at this time, it should be used in a weak state—about one gallon to seven of water. The most convenient time, however, for grass lands would, under all circumstances, be in the early spring, that is, just at the commencement of the growth of grass. Immediately after a first cutting of grass a sprinkling of ammonia water would produce an abundant second crop in a short time; then it might be used a little stronger, say about one part to five parts. When used for seeds or roots, they should be allowed to sprout before its application, and then used in a very weak state, or else used as a compost, before they are sown or set.

It has been asserted by some experimenters that steeping seeds in some salts of ammonia, or in urine, for a short time before they are sown is a beneficial practice, though we know that many doubt this.

The tendency of ammonia to fly off has been hinted at. This is owing to the peculiar properties of ammonia. A very low heat will cause it to evaporate when it is free or unmixed with an acid; but there is a method of preventing ammonia flying off, and this lays up in the land a store for two or three years. The method is by mixing it with some substance that will unite with it, or, as the term is, fix it. The following experiment will show how this may be accomplished better than much explanation, and, if tried, will convey a useful lesson to the mind of the individual who has not made chemistry a study. Buy one ounce each of strong spirit of hartshorn or ammonia and oil of vitriol at the druggist's, which will cost about 4d.

EXPERIMENT.—1st. Put half of the ammonia into a cup and place it near the fire or in a hot oven. After a short time it will have evaporated, the cup will be dry and empty.

2nd. Mix about a teaspoonful of the vitriol with two or three teaspoonfuls of water, and put this to evaporate in the same way. In this case you cannot evaporate the liquid with a low heat. If the heat be great and continued some time, the vitriol will become brownish, and will at length evaporate.

3rd. Now put the other half of the ammonia into a cup, and to it add a few drops of the oil of vitriol, and keep adding vitriol, by a few drops at a time, till the ammonia does not smell, then place it near the fire or in a hot oven as in the former cases, and it will be found that, instead of the whole being evaporated, or its becoming brown in colour, there will be left at the bottom of the cup a white salt.

This salt is called by chemists sulphate of ammonia, being a compound of oil of vitriol or sulphuric acid (as chemists term vitriol) and ammonia. The ammonia having in this case become fixed, it will no longer be driven off by heat. Acetic acid (distilled vinegar) or common vinegar will answer for the experiment as well as vitriol, but in this case the salt would be the acetate of ammonia.

To add sulphuric acid or oil of vitriol to the ammoniacal liquor before applying it to the land would, in many cases, be a great saving to farmers. The quantity required in order to perfectly fix the whole of the ammonia would be about one lb. of oil of vitriol to every ten gallons of ammoniacal liquor of the strength it is sold at the gas works; but if half of this proportion, or half a lb. of vitriol to every ten grains of liquor, were used, it might be still more advantageous, as by this means the unfixed ammonia would be taken up by the plants the first year, and a larger supply left for the succeeding years.

What has been said may induce some to try the effect of the application of ammoniacal liquor on their land. There is no doubt the judicious use will be highly beneficial. There are one or two cautions that should be impressed on the mind of the agriculturist in the use of it. One is, not to use the liquor in too strong a state; the other is, that the farmer must not use it as an entire substitute for, but as an important aid to, manure.

The necessity for the first caution will be seen on reading the account of the experiments that have been tried, and it will be obvious that the second caution must be observed on perusing the notes on the inorganic constituents of plants and the constitution of soils; for it will occur to every mind that, if a plant requires certain salts, and if these salts are not in the soil, they must be supplied or it will not grow; thus clover would not grow without lime, nor potato without potash. If the soil becomes exhausted of potash, that must be added by manuring in some form; but, as this or other salts cannot be taken up by the plant without ammonia, it is plain that the ammonia is of great value as a helper.

Little has been said on the use of ammoniacal liquor in garden operations, but of course the previous remarks apply equally to horticulture as to agriculture, and can be brought into practice as well by gardeners as by farmers.

The full development, the perfecting of individual plants, flowers, and roots, appears more desirable in the case of the gardener than the farmer; and attention on the gardener's part to give a full supply of ammoniacal manures, and the judicious application of them, will produce the desired perfection much more rapidly and effectively than without. To the gardener, especially, there is an advantage in the use of gas ammoniacal liquor that we cannot omit stating—it is the property it possesses of destroying noxious insects. The species of green fly which infests the pea and bean plant is destroyed by one or two applications of *weak* ammoniacal liquor; and so are the insects which are hurtful to other plants, shrubs, or vegetables. A convenient mode of applying the liquor in such cases would be with a large syringe. It destroys, also, many kinds of worms, so that it will be useful if occasionally used on lawns.

Correspondence.

WHITE'S HYDRO-CARBON GAS.

SIR,—I take the liberty of sending you herewith a batch of our local papers, from which you will see that we are here, near your antipodes, engaged in a fierce contention upon the merits or otherwise of Mr. White's scheme for making gas from resin and water; and had it not been for your excellent Journal, which reaches even these distant shores, we should have been quite overwhelmed with the *exparte* statements of the inventor's agents and friends, one of which, however, has quite taken us by surprise, and this is Mr. Adam Wilson's assertion, that the engineer to the Liverpool Gas Company is one of its most enthusiastic supporters in England, and he consequently congratulates our public upon the fact of a "gentleman of Mr. King's experience and standing, though connected with coal gas works, being divested of the prejudice which appears to exist in the JOURNAL OF GAS LIGHTING."

The scheme is likely to come to an early end, but, if half of what is stated of the system be true, I see no reason why the gas company of this city should not adopt it; and you will oblige a numerous class of your readers abroad if you will give some information in an early number as to the success it has met with in the old country. AN EMIGRANT.

Sydney, N.S.W., Jan. 30, 1851.

[The patentees' agent in Sydney will doubtless keep our correspondent acquainted with every success which attends their operations here, our last intelligence being to the effect that Messrs. Schwabe and Co., of Rhodes, near Manchester (to whom Mr. White referred in his letter, inserted in the JOURNAL for April, 1850), have abandoned its use after more than a year's trial; and that the patentees had lately substituted cannel coal for resin, with results which had astonished them, but not us. The assertion that Mr. King is a convert to the system, is an impudent misrepresentation of the facts, as we know that no one has expressed himself in stronger terms against the possibility of resin successfully competing with coal for gas-making in this country, than has the talented engineer of the Liverpool United Gas Company. The following extract from a leading article in one of the papers sent to us puts the matter in so just and unanswerable a form, that we cannot do better than transfer it to our columns:—

Extract from the *Sydney Morning Herald* of Jan. 21, 1851.

"Some of our contemporaries have expressed their surprise that we have not noticed in our leading columus the attempt that is being made to introduce the manufacture of hydro-carbon gas. Our reason is a very simple one—we are not aufficiently acquainted with the subject to express an opinion upon it. That water will yield a non-luminous gas, that resin will yield a gas of high illuminating power, are facts that have been long known, but whether, by mixing these gases, an article can be produced which will be able to compete commercially with coal gas remains to be proved. At Southport, a small town near Liverpool, the town commissioners (a body resembling a town council) were induced by the patentee, Mr. White, to give his plan a trial. The experiment was commenced on the 1st of January, 1850, but no acconnts of the cost had up to the latest dates been published. By gas engineers in England, Mr. White's plan was declared impracticable. As they are most of them connected with the existing coal gas companies, they may be looked upon as interested parties, and their impartiality be suspected; but there is one fact that strikes us as having a very material bearing upon the question. During the last two years there has been a regular 'cheap-gas agitation' going on in London, and, in consequence of the old gas companies refusing to lower their rates to the extent demanded, a new company was formed, called the Consumers' Company, which was making extensive preparations and expected to commence lighting in October last. During the whole of the discussions that took place (and for upwards of a year the subject was debated in the public papers) we do not find any reference made to Mr. White's plan. No affection for existing companies, no fear of injuring existing interests, could have had any weight with the projectors of the new company, for they started in open and avowed opposition to them, and if there had been such advantages to accrue from Mr. White's plan, as its supporters have appeared to imagine, it is hardly possible that it should have been altogether neglected by a body comprising among its members some of the shrewdest men in London. We do not, however, wish to be understood as condemning Mr. White's plan. All we say is, that there is no evidence at present on which to form an opinion as to the certainty of success."

ED. J. G. L.]

REMARKS ON THE USE OF CHLORINE AS A TEST FOR ESTIMATING THE ILLUMINATING POWER OF GAS, AND ON THE VALUE OF CERTAIN ENGLISH COALS FOR GAS PURPOSES.

SIR,—The last number of your journal contains a paper from Andrew Fyfe, Esq., M.D., of Aberdeen, designated "Remarks on the Mode of Ascertaining the Illuminating Power of Coal Gas," &c. The writer has from time to time given so much valuable information on that and similar subjects relating to gas, that I have felt some diffidence in making any exception to the statements contained in the paper; but as these statements do not appear to me to be altogether correct, and as the mode of testing gas upon which he places so much confidence is open to strong objections, I shall take the liberty of pointing out the inaccuracies which strike me, and also of adding a few observations where they appear to be called for.

Leaving the first statement containing the general results of three different descriptions of coals to be noticed afterwards, I will first endeavour to show the nature and inaccuracy of the "chlorine" method, taking in briefly, by the way, the results obtained from the trial of eight different kinds of coals; and, lastly, I will try to point out the value which should be put upon certain English varieties of coal which are generally stated in the paper.

Firstly, then, with respect to the "chlorine method." It is well known that coal gas is composed of a mixture of gases, consisting of (when prepared for use) olefiant, light carburetted hydrogen, and

hydrogen gases: of these gases, the most valuable for the purposes of illumination is the olefiant, which is composed of two atoms of hydrogen and two atoms of carbon, condensed into one volume; it burns with a white flame. Light carburetted hydrogen is composed of two atoms of hydrogen and one atom of carbon, condensed into one volume, and, as its composition denotes, is of much inferior value to the former gas; it burns with a yellow flame of no great intensity. Hydrogen possesses no carbon, and, on combustion, gives a very feeble light; it may be considered as serving as a vehicle for the combustion of the other gases.

The chlorine test is used for the purpose of ascertaining the amount of olefiant gas contained in any given volume of the mixed gases before stated, and is applied in the following manner. A certain quantity of chlorine is introduced into a graduated tube placed over water containing the mixed gases to be operated upon; immediately on its introduction the tube is covered with an opaque case to prevent the action which light would otherwise have on the light carburetted hydrogen, and the condensation caused by the absorption of olefiant gas by the chlorine is noted, and the proportion of it contained in the mixture is from thence determined. It will be seen that chlorine is only made use of as an agent for the separation of olefiant gas, and the light carburetted hydrogen remains unnoticed. Now, if this latter gas possessed no illuminating properties, or if the proportion was the same in all mixed gases, the test would be a complete and correct one; but as light carburetted hydrogen does give light, as has been already stated, and as the proportion of it does vary according to the system of manufacture adopted with the same material, then I conceive that the test under consideration cannot be pronounced one which can be fully relied on.

With the view of making these remarks more clear, I will assume that the mixture of gases about to be tested by chlorine contains gases in the following proportions:—

Olefiant gas	10 parts.
Light carburetted hydrogen . . .	40 „
Hydrogen	50 „
	100

Now, it is evident that the absorption of the olefiant gas leaves 40 parts of light carburetted hydrogen possessing illuminating properties; therefore, if another sample of gas, containing the same proportion of olefiant gas and only half the quantity of light carburetted hydrogen, were tried by the same method, the test would give similar but incorrect results.

There is no doubt that this has been one cause of the variation in the value of the gases, noticed by the writer, between the chlorine test and the photometer. I observe that the value put on the English coals is much lower than my experience in their use will warrant; and I conceive that it arises from the mode in which the experiments have been conducted. It is usual in making experiments to adopt a similar method of carbonization of the materials under examination, without reference to the peculiarities each variety may possess; this is, in fact, unavoidable, for it is only by constant attention to the working that the most suitable process can be discovered; but it is unfortunately sometimes the means of putting an incorrect value on some of the materials operated upon, which is the case in the results shown in the second statement I am now about to notice.

The productive power of English caking coal is there stated at 9·746 cubic feet per ton; Parrot at 10·500; and Ramsay's at 9·746; the latter is very nearly correct, owing, I have no doubt, to the method employed in its carbonization being suitable to its peculiar qualities; but in both the other cases very different results may be obtained: for instance, caking coal of the best description will produce from 11·000 to 11·500 cubic feet of gas, and Parrot 11·500 to 12·000 cubic feet, of a quality superior to that noticed in the statement, so much so that the per centage of olefiant gas will average from 9 to 10 per cent.; but I shall have again to refer to this subject, when considering the mode adopted for examining gas by the photometer noticed in the last statement. It may not be out of place to allude to the importance of testing different gases to the engineer, for he has not only to examine the manufacturing value of the materials for the production of gas, but he has also to carry out all the arrangements required to apply the information so obtained, so as to be practically of value; and in so doing, unless he clearly understands the whole of the subject, important mistakes may be made, and he may find his labours have turned out unprofitably. This Dr. Fyfe shows clearly by his experiments on various candles and burners, which are very valuable.

The plan I have generally adopted in my examination of gas by Bunsen's photometer is the one which Dr. Fyfe has, from a thorough investigation of the subject, been led so strongly to recommend, viz., that of first ascertaining the most suitable burner for the economical combustion of the gas under trial, and the quantity required for its complete combustion. I noticed some time back the mistake which had been made in a comparative trial between the gas produced at the Western and Chartered Gas Works, arising entirely from a neglect of these precautions; this error was, I think, only partially corrected afterwards. But I have before remarked that even this method is not sufficient to enable the experimenter to arrive at the true value of different materials, but only so far as they can be ascertained by the mode of manufacture which he has adopted; therefore it is that I wish to show the incorrectness of the last statement, in which is given the illuminating power of the gas produced from four different materials, tried with Bunsen's photometer, so far as regards the English caking* and Parrot coals, or, to use a more correct term, "Wigan cannel." I have before given the quantity of gas produced by each; and have therefore only to add, that the illuminating power of one foot of caking coal gas is equal to from 3¾ to 4 candles; and 1 foot of Wigan cannel gas to from 5 to 5½ candles. These results put a different value upon coals when the increased production of gas is taken into account.

X.

[We cordially agree with our correspondent in repudiating the condensation by chlorine as a test of the illuminating power of gas, and with him we prefer an analysis to all the tests; but he must be aware that few managers of gas works are competent to make such an examination, and are consequently compelled to resort to the photometer as the next best test within their reach, a course which he has himself followed. We regret, however, that we are compelled to differ from the opinion he emits in the concluding part of his observations, regarding the illuminating power of caking coal and Wigan cannel gas, as shown by the photometer. A considerable space in our present number is devoted to an elaborate examination of these questions, and it would be useless to go over the same ground again. They prove that the illuminating power of gas from Newcastle coal does not exceed 2·6 candles (120 grains) per foot, and from Wigan cannel coal 3¾ candles, as *ordinarily consumed*. We say emphatically ordinarily, because nine-tenths of all gas is consumed in burners giving a light not exceeding 10 to 12 candles; larger lights being confined to spacious shops and public rooms, forming scarcely a tenth of the entire consumption, and in the remaining nine-tenths the value will not, except in few instances, exceed what we have stated. We admit that it is possible by increasing the quantity of gas and the size of the burner to obtain 2·7 candles in one case, and 4·2 in the other, and possibly more with very large burners, but their employment is rather the exception than the rule, and such a standard cannot be fixed upon as the illuminating value of these gases, as ordinarily consumed.

We apprehend also that our correspondent labours under some misapprehension as to the value of the midland coals. In our experience the Derbyshire alone yields a gas of higher illuminating power than the Newcastle, and even this cannot be stated at more than 2$\frac{8}{10}$ candles per cubic foot, when consumed in a five-foot argand burner; but, as its produce falls short of the Newcastle by nearly 2000 feet per ton, it ranks in value considerably below it, and cannot be estimated at much more than 350 lbs. of sperm candles per ton of coals, independent of the inferior character of its coke. In conclusion we beg to say that we shall be happy to meet our correspondent and repeat with him any experiments he may feel inclined to try, with the view of settling this question; or, if he has any new process for treating Wigan cannel, or any other coal, by which he can obtain the results he states, our columns are open to him to explain its merits.—Ed. J. G. L.]

IMPROVEMENTS IN GAS METERS.

Sir,—In your Journal for May, 1851, I observe a letter from Mr. Henry Jones, London, the aim of which seems to be twofold, viz., to damage my improvements and to advertise his own. Whatever Mr. Jones's improvements may be, I do not think they can be gathered from his letter; but one thing I think is evident—they are different from mine. I will leave the decision to gas companies, who, I think, are the most competent judges which of the two is the most effective.

My improvement is simply a shifting the entrance of the overflow pipe to that only part of the meter which will render the float effectual for the purpose for which it was intended, viz., a protection to gas companies. In the improved meter the square chamber in front of the meter is extended so as to project 3½ inches from the front of the cylinder-case; the float is made small, and kept as far back as possible; and the entrance of the L pipe brought to the edge of the meter in front of the float, thus making the distance between the centre of the float and the entrance of the L pipe 2½ inches. Now, the meter is 8½ inches thick from the back to the front; the toes of the meter on which it stands when "tilted" are 5 inches from the back; consequently, when the meter is raised $\frac{3}{4}$ths of an inch behind, the water sinks so much in the back of the meter, and rises half an inch in the front, so that the water is 1$\frac{1}{8}$th inch deeper in the front than in the back, thus giving $\frac{1}{8}$th of an inch of a fall on every inch from the front of the meter backwards; so that on 2½ inches, which is the distance between the mouth of the L pipe and centre of the float, there is $\frac{5}{16}$ths of an inch of a fall, or the water is $\frac{5}{16}$ths of an inch deeper at the mouth of the L pipe than it is at the float. This I consider quite a sufficient quantity of water to allow for evaporation, and, with a float thus adjusted, temptation to fraud will be very much reduced indeed.

I have also had a letter from another London meter-manufacturer claiming priority of invention without any evidence whatever. Be this as it may, one thing I claim credit for, that, having hit on a plan so simple and easy of application, I have taken the trouble and risked the expense, that I might make it known to others;

* Making use of the term English caking coals, I include those produced from midland coal-fields, which will be found to produce more gas than those obtained from the northern coal-field, but a different description of coke.

and now, having registered, I claim the protection of the act, and I am determined to use its provisions to secure the privileges it awards me. THOMAS WHIMSTER.

North Port, Perth, May 20, 1851.

Register of New Patents.

EDWARD CLARENCE SHEPHARD, of Parliament-street, Westminster, gentleman, for certain "*improvements in electro-magnetic apparatus, suitable for the production of motive power, of heat, and of light.*" Patent dated October 24th, 1850. (Communication.) Nollet's Patent.

This invention relates principally to improvements in electro-magnetic apparatus or arrangements, having for object the production of certain gaseous compounds, which, by their elasticity, dilatation, and combination, produce motive power, light, and heat. The application to the production of light is effected in the following manner:—

The patentee describes the means by which he produces an artificial light in a vacuum. This apparatus consists of a large hollow glass globe, which may be ground inside, if desired to disperse and soften the light to be produced in the interior of it. This globe has a short neck attached to it, in which is placed a truly-fitting stopper. Through a hole in this stopper fits in the most air-tight manner a glass tube, by which the communication with the air-pump is effected. When the most perfect vacuum that can be obtained in the inside of the globe has been reached, this glass tube is then hermetically sealed, and broken off, as close to the stopper as possible. In the centre of the stopper is a copper tube which passes down to nearly the centre of the globe. One of the wires from the pairs of helices enters the globe through the stopper, and is attached to the side of this copper cylinder, not far from the top. The other wire enters through the stopper, on the other side of the copper tube, descending to a short distance below the bottom of the copper tube, and, turning at right angles, supports a cone of charcoal. The apex of this cone of charcoal is exactly under the centre of the copper tube, in the axis of the globe, and of the tube. In the lower part of the copper tube there is a narrow groove, through which descends prepared charcoal, from the space above the groove. Above the space containing the charcoal is a leaden weight, which rests upon the charcoal so as to force it out of the space, down through the grove. The weight of this leaden weight is adjusted so as to cause the proper amount of charcoal to issue from the bottom of the groove, to keep up the light in the intensity required, and in a perfectly continuous manner. When the apparatus is in operation, the apex of the cone of charcoal, and the charcoal forced down through the groove, will be pressed together; and there will thereby be produced a most brilliant incandescence, which will, of course, last as long as the charcoal is supplied through the groove.

The claims are:—

First. The arrangement of four compound magnets, in the manner above described.

Second. The arrangement of the four pairs of helices by means of armatures and other contrivances, as above described.

Third. The system of parallel multiplying spirals united together in cylinders of indeterminate lengths; and producing powerful induced currents by their combination.

Fourth. The oscillating arrangement of helices, as above described.

Fifth. The rolling arrangement of helices, as above described.

Sixth. The substitution of flat spirals for those constructed of wire, as described.

Seventh. The system of electro-magnetic current-condensers.

Eighth. The application of dry piles, and of secondary piles, for the purpose of increasing the intensity of the primary and secondary currents.

Ninth. The electro-chemical motive power, as above described; but only in as far as regards the cylinder and the other appendages described.

Tenth. The apparatus, as above described, for lighting by means of the incandescence of prepared charcoal.

Eleventh. Lighting by means of hydrogen gas saturated with the vapour of a hydro-carburet, as described.

PETER SPENCE, of Pendleton, Manchester, manufacturing chemist, for "*improvements in the manufacture of alum, and certain alkaline salts; and in the manufacture of cement; part of which improvements are applicable in obtaining volatile liquids.*" Patent dated November 12th, 1850.

The patentee's first improvement consists in the manufacture of alum from shale, schist, fireclay, &c.; the shale of the coal measures being preferred. The shale is first calcined in heaps in the open air, as directed in the patentee's specification of November, 1845, for improvements in the manufacture of alum. After undergoing this process of roasting, the shale is to be treated by one of the three following modes of operation, according to the texture and quality of the shale employed.

First Process.—Into a leaden vessel or tank, placed in brickwork, about four feet deep, and of any convenient size or shape, put one-fourth its content of sulphuric acid, of sp. gr. 1·75, and to it add a quantity of hot shale from the calcining heaps. Stir the mixture so as to cause the shale to absorb the acid, and fill the tank to within six inches from the top; then cover the whole with spent shale or ashes, and allow it to stand four or five days, by which time the mass assumes a dry appearance, and the acid has become saturated with alumina. Next remove the contents of the tank, and place them in another lead vessel, four feet deep, and of any convenient size, provided with a false bottom of tiles, placed about six inches above the bottom of the tank; and to the prepared shale add boiling-hot distilled ammoniacal gas-liquor, prepared and treated in the way hereinafter mentioned. Allow the mixture to stand one hour, to dissolve out all the sulphate of alumina in the shale; then run off the clear liquor into leaden coolers, to crystallize as alum; fresh portions of boiling ammoniacal liquor may be added, two, three, or four times, and afterwards the residue may be washed with boiling water, to remove all traces of sulphate of alumina.

Second Process.—If the first process does not yield sufficient alumina, take the shale after it has been exposed to the action of the sulphuric acid in the tank for twelve hours, and is become nearly dry, and place it in a reverberatory furnace, into which the heat from the flue of a steam boiler or furnace is allowed to enter, the heat being regulated by means of dampers, and kept at about 200 deg. to 212 deg. Fahrenheit. After about eight or ten hours' exposure to this heat the shale is ready for the extraction of the sulphate of alumina it contains, by the process before mentioned.

Third Process.—When the shale does not absorb at least half its weight of sulphuric acid the third process is to be adopted. For this purpose, a reverberatory furnace fifty feet long, and five feet wide, is employed, containing a lead vessel of the length and width of the interior of the furnace, and of the depth of six inches; this lead vessel is nearly filled with the calcined shale, and sulphuric acid of sp. gr. 1·75, in quantity equal to about half the weight of the shale, is then added; the heat from the fire at both ends is directed over the contents of the furnace, and, after exposure to moderate heat for eight or ten hours, the shale is removed to the tank for the extraction of the sulphate of alumina, in the manner before described.

The patentee states that he does not claim any of these modes of operating; but he does claim the acting on shale or other material, by making it to absorb sulphuric acid, by means of a regulated heat, causing the formation of sulphate of alumina; the material after being so acted upon yielding, by the addition to it of hot mother-liquor, a solution of sulphate of alumina, of sufficient strength for the production of crystallized alum, without evaporation.

The patentee's next improvement is as follows:—In his method of making alum, as described in his specification of November, 1845, the patentee finds that the mother-liquor, after crystallization of the alum, contains free sulphuric acid; this mother-liquor he pumps into leaden vessels, and passes into it distilled ammoniacal gas-liquor; sulphuretted hydrogen escapes, the sulphuric acid is neutralized by the ammonia, and sulphate of ammonia formed, which is employed in the manufacture of the alum.

The patentee claims under this head the distilling ammoniacal liquor into acid mother-liquors of the said alum process, using the solution of sulphate of ammonia thus obtained for dissolving out the sulphate of alumina as before described.

The patentee's next improvement relates to the distillation of ammoniacal liquor; it is also applicable to the manufacture of ammoniacal salts, and the distillation of volatile liquids. The following is his mode of distilling gas-liquors. A series of four boilers or vessels are placed one above the other, so that the contents of the one may admit of being drawn off into the next placed below it; each of these vessels contains gas-liquor, from a reservoir of which a pipe passes to the upper vessel of the series, which is also furnished with an exit-pipe. Into the lower vessel of the series high-pressure steam is passed, causing the gas-liquor to boil, and, the heated vapour of ammonia and water being allowed to pass off through an exit-pipe into the next vessel, the gas-liquor of the second boiler is soon brought to boil, and the heated vapours passing off to the third produce the same effect, until at length the liquor in the uppermost vessel is also made to boil. The heated vapour which now passes off from the upper vessel of the series is loaded with ammonia, derived from the gas-liquor of the several vessels, and is thence conducted into the acid mother-liquors before mentioned, obtained in the manufacture of alum; or into any of the acids employed to form crystallized ammoniacal salts. The advantages of this arrangement are, great economy of fuel, and more complete exhaustion of the gas-liquor, before it is run off to waste. Each distillatory-vessel is furnished with a cock, to allow of the passage of the liquor from one to the other, through the whole series. From the last vessel the exhausted gas-liquor is run off. As the gas-liquors often contain some fixed ammoniacal salts, the patentee recommends the addition of lime to the contents of the vessels.

The patentee claims the distilling ammoniacal gas-liquor, and other volatile or partly volatile liquids, by an arrangement of two or more boilers or vessels, by which the liquor to be distilled can be run from one to the other, through the whole range; and the passing of steam charged with the volatile matters, from one to the other, in the whole range, in the opposite direction.

The patentee's next improvement relates to the manufacture of cement. For this purpose the patentee makes use of the refuse shale obtained in the present process of making alum, as well as in his former process, before mentioned, combining it with refuse gas-lime and sulphate of zinc. To this cement he gives the name of "patent zinc cement." It is prepared by mixing one-third of spent shale with two-thirds of spent gas-lime (both previously screened, by passing them through a sieve, a quarter of an inch in the mesh), and making the whole into a mass, with a solution of sulphate of zinc, made in the proportion of one pound of sulphate to a gallon of water. The mass is then formed into bricks, and baked in a lime-kiln, care being taken not to expose them to a red heat; when cool they are ground by means of horizontal mill-stones, and the cement thus prepared is ready for use.

The patentee claims the use of spent shale for the manufacture of cement or hydraulic mortar. He also claims the use of spent lime for the same purpose; and the introduction of zinc, or the oxide of zinc, as one of the component parts of such cement.

The patentee's next improvement consists in the manufacture of certain alkaline salts, such as carbonate of soda from sulphate of soda, and carbonate of potash from sulphate of potash. For this purpose, a sulphide of barium, or hydrosulphuret of baryta, is prepared, by heating sulphate of baryta with carbonaceous matters, in the usual way; to the solusion of sulphide of barium, a solution of sulphate of

soda is added, by which means sulphate of baryta is precipitated, and a solution of hydrosulphuret of soda remains in solution. The boiling hot solution of hydrosulphuret of soda is then charged with carbonic acid gas, heated to about 200° Fahr.: the solution of the salt being made to pass through a perforated iron plate into an iron chamber, twenty feet high by eight in diameter, filled with coke. The solution, trickling through the coke, comes in contact with the heated carbonic acid gas, made to enter the bottom of the chamber, sulphuretted hydrogen is liberated, and, passing off through an exit-pipe at the top of the chamber, may be employed in the manufacture of sulphuric acid; whilst the solution of carbonate of soda is drawn off through a cock, placed in the lower part of the chamber, and evaporated to form soda ash, or set aside to crystallize. The carbonic acid gas employed may be obtained from chalk, by the action of hydrochloric acid; or if the sulphuretted hydrogen be not required, for the manufacture of sulphuric acid, the carbonic acid gas required may be obtained from a charcoal furnace. The process above described, for the manufacture of carbonate of soda from sulphate of soda, is equally applicable to the manufacture of carbonate of potash from sulphate of potash.

The patentee states, that he does not confine himself to the mode above specified, of obtaining solutions of the hydrosulphurets of soda and potash, nor to precise details of his method of carbonating the same; and he also states, that he is aware of that a somewhat similar mode of manufacturing the carbonates of soda and potash has already been patented, the difference between his process and the other consisting in the fact of his employing carbonic acid, at an elevated temperature, whilst, in the other process, carbonic acid, at ordinary temperatures, is employed, which is ineffectual in producing the desired result.

The patentee claims the manufacture of carbonate of soda and potash by exposing solutions of the hydrosulphurets of soda and potash to an atmosphere of carbonic acid gas of an elevated temperature.

John Swindells, of the firm of Swindells and Williams, of Manchester, and Ince, near Wigan, manufacturing chemist, for certain "*improvements in obtaining products from ores, and other matters containing metals; and in the preparation and application of several such products for the purpose of bleaching, printing, dyeing, and colour-making.*" Patent dated November 14th, 1850.

The patentee's improvements consist, first, in obtaining metals and other products from ores containing copper and silver, or copper alone; from ores containing chromium; and from the ores of zinc. Secondly, in the application of some of these products to useful purposes, in dyeing, printing, and bleaching. In the case of ores containing copper and silver, the patentee places the roasted ore in water-tight vessels, and pumps on them a weak solution of ammonia, of about 980° sp. gr., until the ore is saturated; the whole is then covered up and allowed to remain from twelve to twenty-four hours, when the liquor is drawn off. The ammoniacal liquor will be found, on examination, to be saturated with oxide of copper, and, if any silver be present in the ore, the solution will also contain oxide of silver. The patentee next proceeds to the separation of these metals from the ammoniacal solution; for this purpose he prefers to use hydrochloric acid, or a solution of either of the muriates, to throw down the silver; and, having removed the chloride of silver thus formed, he proceeds to separate the copper, by means of hydrosulphuric acid, or a solution of some hydrosulphuret.

To separate the zinc contained in the ores of that metal, the patentee mixes sulphuret of zinc with about its own weight of either common salt or muriate of potash, or muriate of one of the alkaline earths, and calcines the mixture by an oxidizing flame, with a slow protracted heat, until the sulphur of the ore is converted into sulphuric acid. He then dissolves out the salts produced by means of water. These salts consist of sulphate of soda, and muriates of zinc and iron, which the patentee separates in the usual way, by first obtaining the sulphate of soda, and afterwards precipitating the oxides of iron and zinc by means of lime or other alkaline earth, and afterwards smelting the oxide of zinc in the ordinary way.

The patentee claims the extraction of copper and silver from the ores containing those metals, by means of ammonia and ammoniacal salts.

Henry Medhurst, engineer, in the employment of Messrs. Shears and Son, of Bankside, Southwark, for "*improvements in gas meters.*" Patent dated November 12, 1850.

The improvements here claimed comprehend:—

1. The application to dry gas meters of conical seated valves, with suitable passages for the introduction and discharge of gas into and from the meter; the valves (with the exception of their faces) and the apparatus for actuating them being so arranged as to be kept from contact with the gas, thus preventing corrosion and ensuring greater durability and facility of inspection and repair when needful.

2. The introduction in wet meters of a suitably-formed case with a small hole therein near the bottom, for the float to rise and fall in, the effect of which is to prevent the float and valve from falling too rapidly under the sudden pressure produced by the introduction of gas into the meter, and thereby obviate the disadvantage of a wavering or unsteady light, which, it is stated, not unfrequently results in wet gas meters of ordinary construction under similar circumstances.

George Robins Booth, of London, engineer, for "*improvements in the manufacture of gas.*" Patent dated November 12, 1850.

Mr. Booth proposes to enable consumers of gas to supply themselves by means of an apparatus (which he claims, as also the mode of operating with it) in which it may be obtained from oleaginous, tarry, or bituminous substances. This apparatus consists mainly of a cylindrical metal casing, in which is a fireplace lined with clay and coke, and having a muffle over it, above which is suspended by its neck a retort terminating at bottom in the form of an inverted truncated cone, the inclined sides having steps or corrugations to receive oil to be operated on, which is supplied by one or more feed-pipes when the retort is of a cherry-red heat. The gas generated passes off through a pipe and intermediate chamber to a vessel containing coke or pumicestone for the purpose of purifying it for use. The oil which condenses in the intermediate chamber is re-run into the retort through a pipe provided for the purpose, and again distilled together with the carbonaceous residuum of the preceding operation. Should the soot be allowed to accumulate after each operation, an airhole must be provided to the retort for the purpose of burning it out.

Parliamentary Intelligence.

GREAT CENTRAL GAS CONSUMERS' BILL.

May 15.

The committee upon this bill, consisting of Mr. Beckett Denison (Chairman), Mr. Matheson, Mr. Monsell, Mr. Jackson, and Mr. Baillie Cochrane, met this day in No. 9 Committee-room.

Mr. Sergeant Wrangham and Mr. Wilde appeared on behalf of the promoters of the bill; and Mr. Talbot, Q.C., with Mr. Hope, Q.C., and Mr. Burke, to oppose on behalf of the City of London Gas Company, and various merchants, bankers, and traders, petitioning against it. Considerable discussion took place as to the *locus standi* of the City Gas Company, but eventually, on the room being cleared, the committee decided in favour of the *locus standi* of the parties.

Mr. Sergeant Wrangham, in a speech of considerable length, then opened the case, recapitulating the principal features of the measure as set forth in the committee of last session, when the company, he said, was derided as one not intended to be carried out. What, however, were now the facts? Since then the promoters had erected their works and laid down their mains at within £700 or £800 of the original estimate of £130,000, and were now supplying gas of the first quality to 4600 consumers at 4s. per 1000 feet. The company would not have been compelled to spend near so much had it not been for the expensive parliamentary contests in which they had been involved, but they were, notwithstanding, in a position to pay five per cent. dividend, and retain a surplus beyond.

Mr. Croll, the engineer, and Mr. Dakin, the chairman, were examined as to the general position of the gas company's affairs, and in corroboration of the statement of the counsel for the bill.—Mr. Croll on cross-examination stated that out of gratitude he had given Mr. Pearson an interest with him in the business, and that, though they were not partners, Mr. Pearson's profits would increase as his own increased.

May 16.

The committee met this day at the usual hour.

The Chairman said that since the last meeting the committee had consulted the Speaker with reference to the decision they had come to of allowing the City Gas Company a *locus standi* against the bill, and the Speaker had apprised them that the opponents of the measure were not entitled to a *locus* unless they could first of all satisfy the committee that the works proposed by the bill at all damaged the *corpus* of their property.

Mr. Burke, for the City Gas Company, contended at considerable length that not only the pipes and mains of the new company damaged those of the old severely, but that they would continue to do so.

Mr. Sergeant Wrangham, for the promoters, replied that, if injury was done, there were penal provisions in the bill for redress.

The room was then cleared, and, after considerable deliberation, the Chairman answered that they had decided upon granting a *locus standi* to the City Gas Company.

Mr. Talbot, Q.C., then, in a long address, called upon the committee to dismiss the bill, on the ground, amongst others, that the promoters of the undertaking had, by means of obtaining the consent of the commissioners of sewers, already become a self-constituted company, and had, in fact, gone to work and established themselves without parliamentary sanction, which was now only sought for the purpose of obtaining limited liability, which, without an act of incorporation, they could not possess.

The room having been cleared, after a lapse of half an hour the public were admitted, and the committee declared the preamble of the bill proved.

The clauses were then settled, and the bill subsequently reported to the House, where it has since been read a third time, and now awaits a committee of the House of Lords.

Miscellaneous News.

COURT OF COMMON COUNCIL.

Tuesday, May 13.

GREAT CENTRAL GAS COMPANY.

A numerously-attended court of the Common Council was held this day, in compliance with a requisition, to take into consideration the following motion by Mr. Thomas Dakin:—"That this court do petition the House of Commons, praying the House to pass a bill to incorporate the Great Central Gas Consumers' Company, so as to ensure to the citizens of London a permanent supply of cheap and pure gas."

The Right Hon. the Lord Mayor took the chair at one o'clock precisely, at which period a large number of members were present. Throughout the whole of the proceedings, which lasted upwards of three hours, the strangers' gallery was crowded, the most intense interest appearing to prevail during the entire sitting.

The memorial to the Lord Mayor, which was signed by eighty-five members of the court, having been read by Mr. Woodthorpe,

Mr. Dakin rose to propose what he considered to be a very important public question, and which he was sorry had not fallen into abler hands. He was not sorry that the names of the parties to the requisition had been read, for although the requisition by no means proved that the court was of opinion that it should petition the House of Commons, yet it was gratifying to his feelings that so respectable an array of persons should have signified their opinion that the subject

was one well worthy of their consideration. He was convinced that whatever differences of opinion might now exist, when the subject was discussed in all its bearings, the court would be of opinion that it was their duty to petition the Legislature on behalf of the Great Central Gas Company. What he had to prove on this occasion was that this was a public movement, and altogether distinct from a question of mere private interest. (Hear, hear.) He should be ashamed of himself if he held up his hand in that court for the mere purpose of furthering his own private interest or personal aggrandizement by means of any position which he might hold under favour of his constituents. This court, however, was the proper arena in which the question should be discussed. The reason he had for putting the requisition before his lordship was, that, at a large public meeting held in the London Tavern, it was agreed that he should bring the question under the consideration of the Common Council, and in doing so he admitted that it would be more consistent with his duty to the court to appear there, not as the shareholder of any company, but as the representative in Common Council of his constituents. The bill for the incorporation of this company had been read a second time in the House of Commons, and on Thursday next it was expected that it would be committed. (Hear, hear.) He regarded the members of that court as the representatives and guardians of the citizens, and he, therefore, in order to show the necessity which existed for the adoption of the proposition he had the honour to make, would briefly trace the history of the gas movement. It was first in that court that he had become acquainted with the grievances of the citizens with regard to the price of gas, and, feeling the truth of the statements which were made, he had become identified with the movement. Subsequently came the reference of the matter to the Court of Sewers—the calling in of the City solicitor—the report made by that gentleman recommending the commissioners to purchase and manage the pipes in case the then existing companies would not come down, and the refusal of those bodies, though most respectfully requested by those empowered to make the application. (Hear, hear.) That was at the latter end of the year 1848. In February, 1849, a meeting was held at the London Tavern, presided over by Mr. Dillon, when it was decided to apply again to the companies. Still they refused, and on the 5th of April next following it was stated that they could not afford to reduce the price per thousand. (Hear, hear, hear.) Finding there was no chance of redress unless the consumers took the matter into their own hands, steps for that purpose were accordingly taken, and if that had not been done the struggle for monopoly would have been kept up even to that hour. What was the first answer given by the companies to the Court of Sewers? That they (the directors of the companies) could not reduce the price of the private lights without adding to that of the public lights. What followed? Why, when they found that the new company was making head, they consented to reduce to 4s. per thousand; and, when they still further saw the danger arising from their folly, they further offered a reduction from 4s. to 3s. 6d. and 3s., so soon "as their surplus profits enabled them, after paying a dividend of ten per cent." Any one, however, who considered that if, in 1847, there was a return of £200,000, and, in 1849, £300,000, the additional £100,000, at ten per cent., would effectually make the 4s. both minimum and maximum. Thus it would be found that, by their clinging to a stilled capital, even to this hour any thing like fair terms had been prevented from being come to. Then, with regard to the proposal to bind themselves by act of Parliament to carry out the agreement with the commissioners of sewers for five years; why, this was an insult to the new company, and also to the gas consumers who sought a permanent reduction. (Hear.) The proposed "amalgamation" had turned upon the words "undertaking" to be valued instead of "works" and good will by ascertained rule. With regard to the Great Central Gas Consumers' Company, all he (Mr. Dakin) need say was that, so far as their private interests as shareholders were concerned, they were perfectly satisfied. (Hear.) Their capital was raised, and their works erected; they had with them a large body of the consumers, and their profits were so ample that, after paying in future ten per cent., they would have a handsome surplus in hand. They had, therefore, nothing to gain by procuring an act of parliament—in a pecuniary sense he meant—but they felt it to be their duty to the citizens of London to ask for such an act of the Legislature, because, as they (the shareholders) had the advantages of the position they had been permitted to take, the directors of the company thought it to be but fair that the benefits should be secured by such an act to the consumers. (Cheers.) Mr. Cardwell, the chairman of the committee on the bill, had on the part of that committee said that the "question that the preamble to the bill was proved had been put and agreed to, and that the decision of the committee was unanimous." This being the case, they did not labour under the slightest doubt but that they should obtain the act of incorporation without difficulty. Supposing they did, however, would that add to their profits? No; it was not for that purpose. Would it increase their power or freedom of action? It would not, for it was a highly restrictive bill. They could not increase the price beyond 4s. per thousand cubic feet; the dividend could not exceed ten per cent.; if the profits exceeded ten per cent. the price of gas was to be reduced. There was a penal clause (No. 35) provided that if they were found furnishing gas of an inferior quality the parties might be amerced in a fine of £100 for every such offence. The corporation also were to appoint persons to test the purity of the gas, to appoint also inspectors of gas, while the payment of such persons would fall upon the Great Central Company. (Hear, hear.) The bill, he (Mr. Dakin) would remind the court, had been agreed to by the officer of the court (the Remembrancer), whose instructions were, that nothing inconsistent with the interests of the public were introduced into it. As to the way in which the directors of the company had performed their promises, he might say faithfully, their object upon the present occasion was to protect the citizens, not to multiply their own profits, nor increase their own means of aggrandizement. He, therefore, begged the court to petition in favour of the bill. The memorial in its favour had been signed by 10,500 gas consumers, while the petition against it had only received one or two hundred signatures. (Hear, hear.) He had now, very imperfectly he feared, discharged his duty; still he hoped that what he had said would be sufficient to show that the bill in favour of which he asked the court to petition was one in which great public interests were involved, and that was a protection of the rights of the citizens. Strife and contention he abhorred; they were not genial with his nature, and it was to him a great comfort to know that such things, with regard to gas matters at least, would soon be put a stop to. He trusted the court would agree with his motion, and that they should join in mutual friendship. All he asked for the anxious labours of the last two years was the sympathy of those with whom he had the happiness to act. If he secured that, he should feel amply repaid for all his services rendered in connection with this long-contested question. (Hear).

Mr. Richard Taylor rose with pleasure to second the motion. He had never heard a stronger case made out. The old companies had neglected a good opportunity. They had spent a great deal of money in endeavouring to upset other companies, and he was convinced that they had reigned with despotic sway over the citizens with their high prices much too long, while he rejoiced to find that the efforts of the new company had proved so successful. He was much gratified to find also that the petition did not seek the advantage of the company only, but that it was intended by the incorporation to secure those advantages to the citizens of London.

Mr. Anderton said he rose to move the previous question, and he should be much disappointed, indeed, if he had not a majority in his favour. (Laughter).

A Member of the Council: Oh! you want to prevent his speaking.

Mr. Godson: You are a flat.

Mr. Anderton: The question before them involved a great principle, and the corporation of London should be careful as to what they were about before they resolved to petition Parliament in favour of a private speculation. (Hear, hear). For the sake of argument he would admit everything that had been said by the mover upon this question. He would admit that all the advantages which it was said would accrue to the citizens would be fully realized. He would admit that the old companies had acted, and in his opinion were now acting, foolishly, in not lowering the price of gas; but were they as a corporation to interfere in promoting a private bill for the establishment of a gas company in the city of London? (Hear). However advantageous it might be to the general body of the citizens of London, yet the question was one which required grave consideration before they, in their corporate capacity, decided upon it. Did they not oppose with all their might and strength, both in and out of Parliament, Perkins's bill for the removal of the cattle market to Islington? Did they not expend thousands of pounds in that contest? The old gas companies were placed in the same position. They stood upon their chartered right; they stood upon acts of parliament. They were all very fond of free trade and everything cheap, but why did they not take off the tolls and the tax upon coals? They talked about cheap gas, but why not, by taking off the duty on coals, give the citizens cheap coals and cheap gas too? Would they do that? ("No.") No, he thought not; they would be fools if they did; for by doing so they would lose half their revenue. His friend Dakin said they had got 10,500 signatures for their petition. Well, what more did they want? Did he suppose the corporation would have greater weight with the House of Commons than that?

Mr. Walter: Yes.

Mr. Anderton: Then the corporation ought to withhold their support as a corporate body. Any members desirous of having the bill—and he (Mr. Anderton) did not say that they ought not to have the bill—let them petition for it in their individual capacity; but he was of opinion that the corporation ought not to interfere. ("Hear, hear," and laughter.) He had no doubt that if they got to the House of Commons with the bill it would have full weight—weight beyond that of the counter petition with its 200 or 300 signatures—but his opinion was, that if they went there they would only be cutting their own throats and establishing a dangerous precedent. He should, therefore, move the previous question, and divide the court upon it, even if he stood alone. (Hear.)

Mr. H. Lowman Taylor, in seconding the amendment, said there were some gentlemen connected with the company for whom he entertained the highest respect. He might mention the chairman (Mr. Dakin) and one of the solicitors of the company (Mr. Hardwick). He regretted that those two friends of his belonged to the company. If any remarks of his could influence any member of the court, he should use his utmost endeavour to dissuade the court from adopting the course which they were asked to take; but he feared that the members of the court came there with a predetermination to adopt the motion that had been proposed. ("No, no," and "Hear, hear.") The company over which Mr. Dakin presided had much more difficulty than he would give them credit for. They endeavoured to persuade the public they were going on prosperously, but it would be very hard indeed to convince him (Mr. Taylor) that their statements were correct. He would, however, say, that Mr. Dakin had a difficult game to play, and he had played it well. He would not say that Mr. Dakin had "gulled" the public, but he and the officers connected with the company had endeavoured to persuade the public that their concern was a prosperous one, and that the directors had performed all their promises. They said they were able to pay ten per cent., and to have a handsome surplus besides. (Hear, hear.) But did it not positively come out, on the face of their annual statement, that they were only able to pay five per cent?

Mr. Dakin: There is five per cent. over three months' and three weeks' working.

Mr. Taylor thought the shareholders rather unfortunate, and that they should demand their ten per cent. This was one of the ways in

which the public had been, and were now, "gulled." His friend (Mr. Dakin) was not taking the course he should in a public meeting. He had a right to reply, but he should wait for a proper opportunity. He (Mr. Taylor) would not say the accounts were wilfully misrepresented, but certainly he hardly knew what to call——they were misarranged.

Mr. Brooks: "Cooked." (Laughter.)

Mr. Taylor did not think his friend Dakin would cook the accounts of any company; but, being unfortunately connected with a company which had not succeeded, he was obliged, in order to show the public some semblance of prosperity, to cook the accounts. He (Mr. Taylor) wanted to know whether all the outstanding debts of the company had been taken into the account? He would venture to assert broadly, as his firm conviction, that there were thousands and thousands of pounds not taken into the account; and that, if they were, instead of the company paying half the dividend they had promised to the public, they would show by their balance-sheet that they could not pay 6d. It was a notorious fact that there was a large amount of outstanding debts due to Messrs. Rigby, the contractors, and Mr. Chadwick, the pavior.

Mr. Dakin: "Hear, hear!"

Mr. Taylor: His friend said "Hear, hear!" admitting the fact. (Laughter.) He always dreaded lawyers' bills. Here was a lawyer's bill—(Mr. Taylor exhibited a scroll of paper several yards in length, which caused much merriment in the court)—which was large enough to strike terror into the company. He was told that the chairman (Mr. Dakin) acquiesced in the statement that there was a large amount of outstanding accounts not comprised in the balance-sheet. He (Mr. Taylor) was not sufficiently acquainted with those accounts to explain within £10,000 of their real amount; but, taking the outstanding debts at that sum, he would ask where would their five per cent. be? Why, they would find it dwindling down to two and a half. Then as to the question of amalgamation, he could assure the court that the statement which had been made, and the broad assertions which had been made, to the effect that the City Company were the first to make overtures with regard to the proposition for an amalgamation, were not true; and yet these statements had been not only thus broadly asserted, but printed, published, and circulated. He could assure the court, on unquestionable authority, that the City Gas Company were not the first parties to the proposition; nor would he say who was; but this he would say, that the negotiation, after it had taken place, was broken off, not by the City Company, but entirely through faith not being kept by the directors of the Great Central Gas Consumers' Company. This he was at any time prepared to prove, and that he would do if a committee was granted for the purpose. ("Hear," and cheers.) After some further remarks of a similar character, Mr. Taylor concluded by seconding the amendment of Mr. Anderton.

Deputy Lott said that he was glad that upon that occasion he was not met upon his rising, as he had been upon a former one, with hootings and hissing, associated with sounds of a truly unearthly character. He should not say much, but he must say that the efforts of the Court of Sewers in the preparation of their bill to Parliament had been baffled by certain parties in that court, parties who had emasculated and mutilated that bill. ("Hear," and "No.") He thought that certain statements which had been made with reference to the state of the company in some of the public prints ought to be answered at once, so that the credit of the party or parties charged might be maintained, and their character rescued from damage. A series of seventeen questions had been put by a writer in one of the papers, and he (Mr. Lott) hoped Mr. Dakin would answer them when he rose to reply.

Deputy Harrison said that he was fully prepared to show that the parties connected with the old companies had been most foolish in this business. In the earliest part of the movement, with reference to that question, they had so acted. They had been obstinate, even from the first time that the chairmen of the two companies had waited upon the commissioners of sewers, when they said they could not reduce below the 7s. per thousand. Meeting after meeting was held, but the directors were inexorable until they were so fixed by public opinion, and the perseverance of those in office, who considered the charge so unjust that they were compelled to give way. [Deputy Harrison then proceeded to narrate fully the steps taken by the commissioners of sewers up to the period when the directors of the old companies, who had said they could make no further reduction, expressed themselves ready to reduce to 4s. per thousand cubic feet. These statements having from time to time appeared in the morning journals, it is not necessary to repeat them here.] As to Mr. Anderton's reference to Perkins's Islington Market, why, the thing was perfectly dissimilar. In the one case (that of the gas) there would be a saving of £70,000 per annum to the citizens; in the other there was likely to have been a considerable loss. That gentleman had also said that the Government might say, "You are going for cheap gas; have you not got tolls? Why not take off your tolls?" — (Mr. Anderton: "Quite right.")—Why, did they not know that their tolls were mortgaged, and the money spent in improvements within the City? From these improvements the whole of the citizens received benefit. The worst of this matter was that gentlemen on the other side only saw half the question, and that evidenced the hollowness of their argument. Then it had been said that the petition from the company would have but little weight. Weight! Did such parties imagine that a petition from the corporation of the city of London, on such a subject, and signed by 10,500 persons, would not have weight? No; the corporation had not come to that yet. (Laughter.) It was entitled to have weight, and would tell when laid before the Legislature. As to Mr. Taylor's speech, he (Mr. Deputy Harrison) contended that that gentleman had most unfairly attacked the Great Central Company by saying that the accounts had been "cooked." Into this question he (Mr. Deputy Harrison) would not go, however, as that would come before another tribunal, and be explained, no doubt, by the chairman in his reply. As to the bill, what was their intention in submitting that? Simply that the consumers might be guaranteed gas of a superior quality; the appointment of competent parties to inspect that quality, and to regulate the service and the meters, and thus protect the customers. As to the accounts, it was absurd to say that they could be "cooked." Why, was it not the fact that a public auditor was to be appointed, and that the accounts would be, as it were, nailed up at Charing-cross, to be read by the whole world? (Hear.) The whole proposition was, in fact, fair and honourable, and deserving the utmost support of every member of that court. Deputy Harrison made many more remarks, and finally sat down amidst loud cheering.

Alderman Sir Chapman Marshall supported and

Mr. Godson opposed the petition.

Alderman Lawrence remarked that the court, in taking the step it had done that day, had put itself into a position of which he was very much ashamed. What was the question before them? They were about to petition Parliament for something; to do some act. What for? For whom? Was it for the corporation? No such thing! The corporation had nothing to do with it. The matter solely belonged to the interests of a private company, incorporated under a joint-stock act. Suppose they resolved to petition, they could not do it through the sheriff; they would have to sneak up with it to the Private Bill Office; and that he had learned upon the authority of their officer, the Remembrancer. He considered such a course as highly derogatory to the character and dignity of the corporation of that great city. (Hear, hear.) Such a course would damage them materially. (Hear.) As to the gas question, he contended that with that they had nothing to do, though, if they were to believe some of the statements, any body might think that the parties could make gas for nothing, and yet get some change out. (Laughter.) Was it becoming in that court, whenever a private company was incorporated, to enlist members of that court to agitate the question, by making presents of shares to some, and giving them at half-price to others, for the purpose of inducing the Common Council to petition Parliament in favour of the speculation? ("Hear, hear," and "No, no," from Mr. Harrison.) His friend seemed rather thin-skinned on the present occasion, although he generally exhibited much of the rhinoceros. (A laugh.) It would be inconsistent with the dignity of that court to lend themselves to such a movement. It should be remembered that the corporation stood upon rather ticklish ground in the House of Commons; and he thought they would be materially weakening their position by petitioning in favour of a private bill. He considered the present proceeding perfectly ridiculous, but, as most of them had made up their minds, further argument was unnecessary. (Laughter.)

Mr. Philips supported the motion.

Mr. Dakin having briefly replied,

The court divided, and there appeared—

For the motion	48
Against it	15
Majority in favour of the petition	33

The petition having been read,

Mr. Anderton moved the insertion of words which would have the effect of binding the new company to the payment of a fixed dividend of ten per cent.

Mr. Lott seconded the motion, which was put to the meeting and lost by a large majority.

The petition was then agreed to.

Mr. Dakin moved that a similar petition be presented to the House of Lords.

Mr. Taylor said it was not competent for any member to make that motion, as notice had not been given of it.

The motion was then withdrawn, and the Remembrancer having received the necessary instructions for the presentation of the petition, the court adjourned.

The Marylebone Gas Consumers' Company.—At the Clerkenwell Court, on Wednesday, Mr. J. B. Holman, solicitor to the Marylebone Gas Consumers' Company, of 15, Bedford-row, was summoned to show cause why he had neglected to send to the office for the Registration of Joint-stock Companies a copy of the prospectus and circular of the above company, whereby he had made himself liable to a penalty of £20 and suspension from practice for a time in the discretion of the court, or be struck off the rolls.—Mr. Taylor, the barrister, and Mr. Herring appeared for the prosecution.—Mr. Taylor said the proceedings were taken under the 7th and 8th Vic., cap. 110, sec. 6, and he was surprised that Mr. Holman, as a solicitor, should have asked what act he proceeded under. Mr. Holman admitted being solicitor to the company, and submitted that the fourth section of the 10th and 11th Vict., cap. 78, put the other parties out of court, the act of 7th and 8th being repealed. Mr. Holman having read an extract from the act, the magistrate at once dismissed the case.

Sheffield Gas Company.—An information by Mr. Samuel Cocker, of College-crescent-road, was lately laid before the Mayor of Sheffield against the gas company of that borough, founded upon the 137th clause of the Gas Company Act, to obtain the decision of the bench on the amount and kind of security which should be given to the gas company by Mr. Cocker. Mr. J. W. Smith appeared for Mr. Cocker, and Mr. W. Wake for the company. The information alleged that Mr. Cocker had required the company to lay the necessary service-pipe between their main in Collegiate Crescent-road and a pipe laid in Mr. Cocker's ground, and to supply him with gas; it alleged that he had also tendered the guarantee of his brother, Mr. T. Fildes Cocker, as security for the rent of the gas supplied; it was added that the company refused or neglected to lay the necessary service-pipe; and that the said parties could not agree upon the additional security to be given. The company was, therefore, summoned to appear in

order that the amount might be settled and determined. This proceeding was under the 136th and 137th clauses of the company's act, which provide that, at the expense of any owner or occupier who may require to be supplied with gas, the company is bound to lay all necessary pipes in any road where their mains are laid, to supply such person with gas; but the company may require security for the cost of laying the pipes and the price of the gas; and, if they cannot agree on the amount of the security, either party may apply to a justice of the peace, whose decision shall be final and conclusive. Mr. J. W. Smith put in a letter from Mr. Unwin to Mr. Cocker, which he said must be taken as a constructive refusal to agree as to the amount of security. This mode had been resorted to as the only way to raise the actual dispute before the bench. They had no power to ask the interference of the bench, excepting to decide the question of security, but, when that should be decided, the company must lay the pipe and furnish the gas, or take the consequence of their refusal. He now tendered again the guarantee of Mr. T. F. Cocker, but added that he was prepared to go into the merits of the case, if the company would agree to be bound by the Mayor's decision: unless they would do that, he should confine himself to asking for a judgment upon the sufficiency and amount of the security.—Mr. Wake first objected that the company had not refused to supply Mr. Cocker, or to accept the security.—Mr. J. W. Smith answered that they did refuse, except upon conditions which were not satisfactory to Mr. Cocker. He admitted that the security had not been required, but it had been tendered and not accepted, and therefore, the parties not agreeing, they asked the judgment of the magistrates.—Mr. Wake denied that there was any disagreement on the ground of the security, and therefore there was nothing for the magistrate to adjudicate upon.—Mr. J. W. Smith replied that the jurisdiction of the magistrate had arisen on the lodging of the complaint that they could not agree, and it was not now to be ousted by saying that they did not dispute the security.—Mr. Wake next urged that the guarantee now put in was not the one previously tendered, but was a more formal document.—Mr. J. W. Smith replied that the former was only sufficient in connection with the letter that accompanied it. The new one was sufficient in itself.—It next appeared that the parties differed as to what were the "necessary" pipes to be laid, Mr. Wake arguing that the company was the only judge of what was necessary, and saying that all they desired was, that the gas should pass through their pipes till it had gone through the meter, and so was measured to the customer. They did not desire to carry it any further.—Mr. J. W. Smith urged that the gas company wanted to do more than Mr. Cocker thought necessary, and therefore he rejected it. The act was so carefully framed to secure the monopoly of the company that he could not raise the question in any other way.—The discussion then turned upon the point whether the security must be by bond or a simple guarantee. It appeared likely to be decided, under the advice of Mr. Blakelock Smith, that the security was sufficient, when Mr. Wake raised a question upon the words that security shall be given "if required by the company," and asked for proof that they had required security, without which any order of the bench would be a nullity.—Mr. J. W. Smith admitted that the company had not formally required security. They had refused to lay the pipe, excepting upon conditions which were not acceptable; and the security had, therefore, been tendered, and the company had declined to accept it. There was no other way to raise the question.—Mr. Wake said it might be done by mandamus, but they were not going to insult Mr. Cocker by requiring security for a few pounds.—Mr. Cocker said he did not see why the company should insist on laying the pipe through his grounds to the house, charging him 1s. 9d. a yard, when he could get it done for 1s. 3d.; and Mr. J. W. Smith complained that the clauses were so dextrously worded as to make it impossible to get at the company.—Mr. Wake replied that they were the clauses of the town clerk, framed expressly for the protection of the public. This was precisely the case which the company, if they had been required to frame a case for themselves, would have liked to try upon its merits, but they could not recognise a jurisdiction which the law had not given.—Mr. Blakelock Smith said it appeared to him there had been an intention to give a jurisdiction, which was frustrated.—The summons was dismissed on the objection that the company had not required security. In the course of the conversation it appeared that the company's men had opened the ground to lay the pipe to Mr. Cocker's house, but he had employed some person to lay the pipe, and now asked the company to connect their service-pipe with it. In the course of the hearing the following letter to Mr. Cocker was read by Mr. Wake:—

"March 27, 1851.

"Sir,—Your letter of the 19th instant was only received at the Gas office on the 22nd, and I was then in London. I now beg to reply to it by saying that the company are, as they always have been, willing to supply you with gas, on your complying with their necessary regulations.

"The requirement made by your letter is, that we shall 'lay a service-pipe to communicate the pipe in your ground with the mains.' This we shall gladly do, if you point out a place for the meter to stand at some point *before* the gas gets to your pipe. At present no accommodation for a meter to be so placed, I believe, exists, and on principle the company refuse to comply with your request, except upon the terms mentioned above. This I have already explained to you verbally, for the matter has now been a considerable time in hand.

"In November last, you will recollect, you called at the Gas office, to request the company to lay mains up Collegiate-crescent-road. In the early part of this year a main was accordingly laid purposely to accommodate you, and on the 4th of February I sent to lay a service to your house, when you thought fit to adopt the trench our man had dug, and, whilst he was thus engaged, caused a pipe, not provided by us, to be laid in it. This was an irregular, and I think an improper, proceeding. The company's man accordingly left the job. Since this I have met you more than once, and endeavoured to show you your error. It appears I have not succeeded, and you now formally demand that the company shall connect the pipe you have thus laid with their main. I distinctly decline to do this; and, to prevent any misunderstanding, I beg to say that I do so to uphold the company's right to require the gas to pass through a customer's meter before it leaves the company's pipes, or pipes which the company have laid. The company, you will recollect, sell by measure, and you must, I think, admit that they have a right, upon every principle of justice and fairness, to keep the article under their own control, and in works of their own construction, until such time as it has been measured out to the consumer; after that they do not assume any control over it in regard to pipes or fittings. That the company have a legal right to require this is, I conceive, indisputable. See the section of the act which requires the company *to lay services at the consumer's expense*. Had the Legislature not seen the necessity of letting the company convey and measure off the gas to the consumer the act would have enabled the consumer to lay pipes to the company's mains, instead of compelling the company to lay for the consumer. Justice I have, therefore, on my side. Law, without justice, I would not avail myself of; for I assure you the only wish the company have in requiring that they shall lay the services is to secure themselves from loss, and to promote the interests of the gas consumers. As a question of profit simply, the laying of services is quite unimportant.

"Hoping you will now see the propriety of the position I take, on behalf of the company,

"I remain, sir, your obedient servant,

"E. Unwin, Managing Director."

Armagh Gas Company.—The annual meeting of this company was held on the 26th ult. The following abstract will show the state of the company's affairs up to the 1st of May last:—

Receipts.

Proceeds of gas sold	£1225	12	3			
Coke, &c.	57	9	11			
				£1233	2	2

Expenses.

Paid for coal	£262	17	3			
Value of coal on hand last year	153	18	7			
	£416	15	10			
Deduct value of coal on hand now	61	0	7			
	£355	15	3			
Salaries, wages, &c.	213	6	2			
Miscellaneous expenses	190	9	6			
Bad debts struck off	32	19	2			
	£792	10	1			
Deduct value of meters included in miscellaneous expenses	31	11	0			
				760	19	1
Leaving in the year profits of				£522	3	1

A sum considerably greater than that realized the preceding year, and caused, in some measure, by the reduced price of coal, the trifling amount of wear and tear during the past year, and the small charge for miscellaneous and other expenses. The committee also recommend that the price of gas be reduced from 8s. 4d. to 7s. 6d. per 1000 cubic feet.

Rennie's Improvements in Gas Making.—The gas retort patented by J. Rennie, Esq., Gowan-bank, has now been in operation at Grahamston Gas Works, Clackmannanshire, for upwards of two months, and is stated to effect an important saving in the production of gas. It is a rotary cast-iron retort, suspended at the two extremities, which rest on a series of friction rollers. Its revolution is effected by an application of lever power, which opens the furnace door and propels the retort in its rotation by the same touch of the fireman's hand, thereby rendering it impossible to feed the furnace without, at the same time, revolving the retort as many degrees as may be necessary. The report of two months' experiment states that more than one-half of the furnace fuel is saved—a saving important everywhere, and especially so where, from distance, the price of coals is high. The gas by the rotary retort is produced at a low temperature, and of a high illuminating power. In the ordinary retorts it is well known there accumulates a large deposit of carbonaceous matter, which proportionally diminishes the yield of gas, and accelerates the decay of the retort, particularly if it is an iron one. Both these losses are diminished by the present patent.

Wood Gas.—The Munich Railway terminus has been lighted with wood gas since the 19th of March last, a discovery whose introduction into Bavaria is due to Professor Pettenkoffer. At present only one retort is in operation, but of such dimensions as would suffice for large establishments. It contains one cwt. of split wood, and emits every hour 350 to 360 cubic feet into the gasometer. In one hour and a half the supply of wood is exhausted, yielding thus 650 to 700 cubic feet of combustible air. The retort is heated with peat, which costs every hour about ten kreutzer (3d.); if there were more retorts in the same furnace, the cost would be still less in proportion. The charcoal obtained in the retorts amounts to 19 to 20 per cent. of the weight of wood used. It is taken out when glowing, and placed in tin boxes closely shut until cooled. The charcoal of fir now produced in the establishment is more compact than that of the common charcoal furnaces, and much sought after by blacksmiths, &c. Of tar, five to seven per cent. of the weight of wood are obtained, which is equal to the best asphaltum varnish. The intensity of light amounts to fifteen wax candles, in a flat burner consuming four and a half English cubic feet per hour. One of the main advantages of wood gas is its quick production, as the same retort will yield in an hour only 180 cubic feet of coal gas, while that of wood gas will, during the same period, amount to 360 cubic feet of gas. The lighting of any establishment can be thus effected by half the number of retorts, and at half the expense of fuel, manual labour, &c.

Experiments Explanatory of the Origin of Coal.—Sir James Hall, in subjecting a mixture of fir sawdust and horn shavings to the action of heat, in a hermetically-closed gun-barrel, was enabled to melt the mixture, and convert it into a sort of artificial coal. M. Cagniard-Latour has extended similar observations to a great number

of different sorts of wood, which he has melted without the aid of any flax; using glass tubes with very thick sides. He has found that in all cases the temperature need not be equal to that of boiling mercury. The tubes did not exceed five inches in length, one-tenth of an inch in diameter, and one-tenth of an inch in thickness. All the specimens experimented upon were dried at a temperature of 212 degrees before they were put into the tubes. They were exposed to the action of heat by simply placing them over a brasier of charcoal. The specimens of artificial coal thus produced were only in very small quantities; but, in applying the flame of a spirit-lamp to them, they all gave, momentaneously, a little flame; some, during the combustion, undergoing a certain swelling up, while the others presented nothing similar. Among the former was principally fir. By repeated experiments, M. Cagniard-Latour has found that very young wood, even heated to 212 degrees, before being placed in the tube, yields a sticky carbon; while old wood, say about thirty years old, which, being dry, yields very meagre carbon, will yield also a rich sticky carbon, when saturated with water before being placed in the tubes. They even give a rich brown resin similar to the asphalte used for paving.

Rating of Railways.—From some remarks of Lord Campbell in the Queen's Bench, on the 7th inst., we are in expectation that a measure is contemplated by which the system of rating such undertakings will be modified or more clearly defined than it now stands. The case was "The Queen *v.* the Great Western Railway Company." Lord Campbell said:—We think it right to state that judgment will not be given in this case during the present term; and we hope that before the next term Parliament may interpose and relieve us from the difficult position in which we are now placed when called upon to administer the existing law with respect to the rating of railways. The Parochial Assessment Act, 6 and 7 William IV., cap. 96, enacts that "no rate shall be of any force which shall not be made on an estimate of the net annual value of the several hereditaments therein to be rated; that is to say, at the rent at which the same might reasonably be expected to let from year to year free of all usual tenants' rates and taxes and tithe-commutation rent-charge (if any), and deducting therefrom the probable average annual cost of the repairs, insurance, and other expenses (if any) necessary to maintain them in a state to command such rent." This rule is easily applicable to all the property which the Legislature had in contemplation in laying it down. But it is wholly inapplicable to a railway extending many miles, with a trunk line and branches through many parishes, the traffic upon different sections of which varies materially, and the expense of working the different sections of which bears no certain proportion to earnings upon them. We are required to determine how a railway company should be assessed in a parish through which a branch of the railway passes, without any station within the parish, the traffic on this branch being comparatively small, and large outgoings being required from the peculiarities of the locality to keep in repair and to work the portion of the railway within this parish; we are directed to consider the rent at which this section of the railway might reasonably be expected to let from year to year, free of all usual tenants' rates and taxes and tithe-commutation rent-charge, and the only guide we have as to deductions is to deduct the probable annual cost of repairs, insurance, and other such expenses without any intimation as to what we are to do with respect to tunnels or embankments, or standing engines employed exclusively within the parish, or locomotive engines employed on the whole line, or the general expenses of the directors who manage the entire concern, or the charge arising from the maintenance of stations, or the employment of police. If we settle all these and similar questions we may be considered to be acting as legislators rather than as judges, making rather than expounding the law. At all events we must proceed upon the most improbable and nearly absurd supposition that a person may be found who would take the portion of the railway which passes through a single parish, and no more, as tenant from year to year. Without some alteration in the law upon this subject by the Legislature we foresee that, although we should give judgment in this case (which we may be obliged to do according to the best of our ability), much trouble, litigation, and expense must still arise both to parishes and to railway companies throughout England. In the case now before us, fifty-three appeals to quarter sessions are consolidated, which might all have been separately prosecuted; and no decision which we are at liberty to pronounce can put an end to the disputes between parishes and railway companies which are now raging. It is not for us to suggest what may be fit to be done by Parliament, but we make no doubt that a rule applicable to the rating of this novel and important species of property might be enacted, both simple and equitable, which would effectually put an end to all future litigation on the subject.

London and its Vicinity.—To the thousands who will flock to the metropolis during the Exhibition of the Industry of All Nations, in the course of the ensuing summer, it will be highly desirable that every opportunity should be given of gaining information on the organization and structure of the gigantic Babylon, its public and private buildings, institutions, places of amusement, and its numerous treasures, in both a moral and temporal point of view. Numerous pamphlets, maps, handbooks, and other modes of conveying some of this necessary knowledge already tempt the eye, and which, as far as they go, are highly useful, but deficient in that extent of general information the progress of the age requires, and which foreigners, inhabitants of the provinces on a visit here, and even the denizens of London themselves, are at all times anxious to avail themselves of. To supply this deficiency, a volume has just appeared from the prolific literary storehouse of Mr. John Weale, of High Holborn, under the above title, elucidating its natural and physical characteristics, its antiquity and architecture, its arts, manufactures, trades, and public establishments, the gas and water companies finding their appropriate place, its social, literary, and scientific institutions, and its numerous galleries of fine arts. In noticing London as the largest and most wealthy city of the world, Mr. Weale has considered it as at once the centre of liberty, the seat of a great imperial Government, and the metropolis of that Anglo-Saxon race whose industry and practical application of the arts of peace are felt in every clime, while they exert an almost boundless influence over the moral and political destinies of the world. The author's object (in which to our view he has been eminently successful) has been to convey a vast body of information, in such a manner as not only to satisfy the mind of the learned and scientific inquirer, but to afford to the man of business and the sight-seer the advantages of a book of reference to those numerous depositories of art and science which abound in the metropolis, and which render such effectual aid towards the refinement of domestic life, by furnishing alike instruction and amusement. The work is illustrated by a beautifully-executed map, scientifically laid down from the meridian of St. Paul's—for the engraving of which alone the author paid a very large sum; and by 205 splendid diagrams in wood engravings from the first artists of the day; the type, the illustrations, and the binding, forming together a volume that needs only to be seen to be appreciated, and which, from the low price fixed for its sale, we hope a very large circulation will reward the author-publisher for the liberality and enterprise displayed in his work.

RAW MATERIALS AT THE GREAT EXHIBITION*

Amongst the raw productions of Great Britain, what may be termed its mineral wealth occupies an important and conspicuous position; for, independently of the cost of carriage, or any manufacturing process, the present annual value of the mineral produce of this country is probably not less than twenty-five millions sterling. However much, therefore, the material prosperity of England may be connected with the industrial energy of its inhabitants, we must not overlook the fact, that wealth, to the above extent, is yearly contributed by our mines alone, and is, moreover, a kind of wealth specially adapted for industrial investment. It is, in this latter respect, that Great Britain differs so largely from many other countries; for, taking California as an example, it may be argued that the mineral produce of this infant state is already rapidly approaching our own in value; and such, undoubtedly, is the case—indeed, the gold of California may perhaps ultimately, as a raw production, surpass the yearly amount of our mineral produce. But there is this remarkable difference between the results obtained,—that, whereas the value of gold resides in itself, and scarcely admits of the slightest increase by the hand of labour,—the coal, ironstone, and other raw materials of this country, afford room for an unlimited investment of industry, by which their value may be increased to any required extent. Thus, although the ironstone of England, in its raw state, is not worth, per ton, the quarter of an ounce of the raw gold dust of California, yet labour may be so concentrated upon it, as to develop an article worth more, weight for weight, than the most costly jewellery fabricated from gold. Of this, steel chronometer balance-springs afford an instance in point; selling, as they do, in some cases, at the rate of ten or twelve guineas an ounce. It is, therefore, in the peculiar nature of our mineral wealth, and not in its amount, that we have so great an advantage over other countries; and, for the same reason, Great Britain may almost be said to have a monopoly of certain arts and manufactures, which monopoly has, more or less, the invariable effect of all monopolies in retarding improvement. On this account it is that we propose to examine, separately, every branch of manufacturing industry, and point out that which is wasteful or defective, leaving it to the inventive skill and energy of our readers to devise remedies for evils which they have not seen, merely because habit had reconciled the eye to their existence.

Having thus briefly announced the object and intention of our remarks, the reader will feel no way surprised at finding coal selected as the first article for consideration, since it constitutes not only the most valuable mineral production of this country in a money point of view, but is also the very *fons et origo* of our industrial wealth. As a raw material there is not, perhaps, in coal, much to furnish matter for the successful employment of an inventive mind; though, even here, Warlich, Wylam, and others, have found their reward. But in the application of this substance as fuel there are many improvements needed, any one of which would amply remunerate the author of an actual amelioration. It is quite susceptible of positive proof that, by no arrangement yet discovered, can more than two-thirds of the heat generated by a given quantity of coal during combustion be fairly absorbed and utilised in any of our manufactories; and, moreover, there are undeniable facts which demonstrate that seldom, in the burning of coal, are more than three-fourths of the total heat which might be eliminated actually obtained, thus justifying the supposition that one-half of all the coal now consumed is virtually wasted, and lost to society. The first of these defects, or the non-absorption of heat by the various objects exposed to the action of fire, has pretty largely attracted the attention of inventors, and within the last twenty years several very satisfactory improvements have been produced, especially with reference to steam-boilers. For the most part these improvements have consisted in lengthening the flues, and exposing a larger surface of the boiler to the action of the heated air passing from the furnace to the chimney. From this arrangement a vast economy of fuel has resulted, and particularly from that form of setting known under the term "Cornish boiler-setting." But there is yet a point in this matter which requires careful investigation, and that is the extent to which the current or draught in such flues ought to be retarded, so as to favour the transmission of heat from the flue to the interior of the boiler. Remembering that air is an extremely bad conductor of heat, and that water about to become converted into steam is also a bad conductor, it is evident that time must form an important element in the perfect transmission of heat from one of these to the other; and

(*Continued on last page but one.*)

* This article, from the pen of one of the most practical chemists of the day, appears in *Newton's London Journal*, and will contain matter interesting to many of our readers, though not immediately connected with our branch of manufactures.

Share List.

THE PRICES QUOTED ARE THOSE AT WHICH THE LAST SALES HAVE BEEN MADE.

The Companies whose names are printed in italic type are incorporated by Act of Parliament.

Number of Shares issued.	Amount per Share £	Name of Company.	Amount paid up per Share £ s. d	Dividend per Cent. per Ann. £ s. d	Price. £ s. d
		ENGLAND.			
		Aberdare			
		Aberystwith			
		Abingdon			
		Accrington £7000		5 0 0	
		Albrighton			
		Alcester			
		Alford, Lincolnsh.			
		Alfreton			
		Alnwick			
		Alston Moor			
250	10	Alton	10 0 0	5 0 0	10 0 0
800	5	Altrincham	5 0 0	4 0 0	
		Amlwch			
160	10	Ampthill	10 0 0	5 0 0	10 0 0
350	10	Andover	10 0 0	6 0 0	11 0 0
		Appleby			
		Arundel			
		Ashbourn, Derby			
		Ashburton			
		Ashby-de-la-Zouch			
		Ashford, Kent			
		Ashton Lan £39,700		10 0 0	
		Atherstone			
		Axminster			
225	20	Aylesbury	20 0 0	5 0 0	21 0 0
		Aylsham, Norfolk			
		Bacup, Yorkshire			
		Bakewell			
		Baldock			
140	25	Banbury	25 0 0		
		Bangor			
500	5	Barking, Essex	4 10 0	5 11 0	5 0 0
250	10	Barnard Castle	10 0 0	5 10 0	10 15 0
		Barnet			
		Barnsley £6000		7 10 0	
100	20	Barnstaple	20 0 0	7 10 0	25 0 0
		Barton			
120	25	Basingstoke	25 0 0	8 0 0	28 0 0
2400	20	*Bath*	16 0 0	6 0 0	25 to 30
		Battle £2000		6 0 0	
56	26½	Bawtry	26 10 0	5 0 0	25 0 0
		Beaumaris			
		Beccles, Bungay, and Lowestoft			
		Bedford			
		Bedworth			
		Belford			
		Bedale, Yorkshire			
		Belper			
		Beminster			
		Berkhempstead			
700	5½	Berwick-on-Tweed	5 10 0	6 8 0	5 15 0
		Beverley			
		Bewdley			
280	10	Bideford	10 0 0	6 0 0	10 10 0
		Biggleswade			
160	10	Bicester	10 0 0	5 0 0	10 0 0
		Bilston £15,100		6 10 0	
		Billericay			
		Bingley £7400		4 0 0	
		Birkenhead £70,000	35 0 0	3 0 0	35 to 37
2400	50	*Birmingham and Staffordshire*	50 0 0	10 0 0	93 to 94
	25	*Ditto*, new shares	7 10 0	10 0 0	12 0 0
928	75	*Birmingham*	75 0 0	10 0 0	139 to 141
		Bishop's Auckland			
		Bishop's Stortford			
		Blackburn £30,000		10 0 0	
		Blandford			
		Blythe			
		Bodmin			
		Bognor			
		Bolton £38,582		9 19 5	
		Boroughbridge			
		Boston £8000		10 0 0	
200	10	Bourn	10 0 0	5 0 0	
		Brackley			
		Bradford, Wilts			
		Bradford, Yorksh. £45,000		9 10 0	
		Brampton, Cumb.			
		Brandon, Suffolk			
		Brecon			
		Bridge-end, Glam.			
		Brierly Hill			
2250	20	*Brighton*	20 0 0	5 0 0	14 to 15
1125	20	„ new shares	16 0 0	5 0 0	
		Brighton and Hove £50,276			
4250	20	*Bristol*	20 0 0	9 0 0	37 0 0
1725	25	*Bristol and Clifton*	25 0 0	6 0 0	25 0 0
		Brixham			
		Braintree			
750	50	*Brentford*	50 0 0	6 0 0	44 to 46
800	25	„ new shares	11 0 0	6 0 0	11 0 0
		Brentwood			
		Bridgwater £6000		5 0 0	
400	10	Bridlington	10 0 0	5 0 0	10 0 0
		Bridport			
		Brigg			
		Broadstairs			
100	50	Bromley, Kent	50 0 0	6 0 0	52 10 0
		Bromsgrove			
		Broughton			
120	10	Bruton	10 0 0	4 0 0	8 0 0
100	25	Buckingham	25 0 0	5 0 0	25 0 0
		Bungay (see Beccles)			
		Burford			
		Burnley £19,946		4 10 2	
		Bursiem			
		Burton-on-Trent			
		Bury, Lanc. £6570			
		Bury St. Edmund's £10,500		5 0 0	
		Buxton			
		Callington			
		Calne, Wilts			
		Camborne			
		Cambridge £34,560		9 0 0	
240	50	*Canterbury*	50 0 0	6 0 0	
240	25	*Ditto*, second issue	25 0 0	6 0 0	57 to 58
		Cardiff £12,000		7 10 0	28 to 29
		Carmarthen			
		Castleford			
		Chapel on the Frith			
		Chard			
		Chatham (see Rochester)			
		Chatteris			
		Cheadle			
		Chelmsford			
		Cheltenham £18,732		8 10 0	
		Chepstow			
		Chertsey			
230	10	Chesham, Bucks	10 0 0		
		Chester			
		Chester-le-Street			
		Chesterfield £13,123		4 17 6	
240	25	Chichester	25 0 0	6 0 0	30 0 0
		Chippenham			
		Chipping Norton			
		Chirk			
		Chorley			
		Chudleigh			
		Cirencester			
		Clifton (Bristol and			
		Cleckheaton, York.			
		Clitheroe			
		Cockermouth			
		Colchester			
		Collumpton			
		Colne, Lancashire			
		Coleford, Gloucest.			
		Coggeshall			
		Congleton £5000		5 0 0	
		Cowbridge			
800	25	*Coventry*	25 0 0	6 0 0	20 0 0
		Cowes			
		Crewkerne			
		Croydon £20,000		5 0 0	
		Cranbrook £1900		5 0 0	
		Crediton			
		Crewe, Cheshire			
		Cricklade			
		Darlaston			
		Darlington			
250	20	Dartford	20 0 0	7 10 0	27 0 0
		Dartmouth			
125	20	Daventry	20 0 0	6 0 0	24 8 0
		Dawley, Shrop.			
		Dawlish			
		Dedington			
500	6	Denbigh	6 0 0	5 0 0	6 0 0
820	10	Deptford	10 0 0	5 0 0	4 10 0
325	50	*Derby*	50 0 0	10 0 0	
90	20	Dereham (East)	20 0 0	4 10 0	
1000	5	*Dewsbury*	5 0 0	10 0 0	8 12 6
		Devizes			
4000	5	*Devonport*	5 0 0	6 0 0	6 5 0
		Doncaster			
280	25	Dorchester	25 0 0	5 0 0	30 0 0
120	25	Dorking	20 10 0	5 0 0	21 10 0
		Douglas, Isle of M.			
209	56½	*Dover*	56 10 0	4 15 4	55 0 0
		Downham			
		Driffield			
		Droitwich			
600	20	*Dudley*	20 0 0	4 0 0	15 to 16
		Dunmow			
		Dunstable			
		Durham			
276	9	Dursley, Gloster	9 0 0	5 10 0	8 0 0
		East Grinstead			
		Elland			
		Ellesmere			
		Enfield			
300	19	Epsom and Ewell	19 0 0		
		Evesham			
		Exeter £40,000		10 0 0	
		Exmouth			
		Eye, Suffolk			
64	25	Fakenham	25 0 0	5 0 0	25 0 0
		Falmouth			
		Fareham			
120	25	Farnham	25 0 0	10 0 0	42 0 0
		Farringdon			
		Faversham			
		Ferrybridge			
		Fleetwood			
		Folkestone			
		Fowey			
240	5	Framlingham	3 10 0		
		Frome			
		Garstang			
		Gillingham, Dorset			
		Glastonbury			
		Glossop £10,000		9 0 0	
		Gloucester £25,000		7 10 0	
		Gomersal			
		Godalming			
		Gosport			
		Grantham			
1000	20	Gravesend	20 0 0	5 0 0	21 0 0
1000	10	*Great Grimsby*	8 0 0	8 0 0	10½ to 11
	25	Guildford	25 0 0	4 0 0	20 0 0
		Guisborough			
		Hadleigh			
		Hales Owen			
300	6	Halesworth	6 0 0	7 10 0	5 10 0
		Halifax £15,000		10 0 0	
		Halstead			
		Hampton Court			
		Harrogate £10,000		5 0 0	
		Hartlepool £15,137		7 10 0	
		Haslingden, Lanash.			
330	50	Hastings and St. Leonard's	50 0 0	6 0 0	60 0 0
		Haverfordwest			
		Haverhill			
		Haworth, Yorks.			
		Hayle			
		Helstone			
		Hemel Hempstead			
300	10	Henley-on-Thams.	10 0 0		
		Hereford £5300		4 0 0	
		Herne Bay			
270	10	Hexham	10 0 0	7 0 0	12 0 0
		Heywood £10,000		5 0 0	
		Highworth (Wilts)			
230	10	Hinckley	10 0 0	5 0 0	7 0 0
		Hindley, Lancash.			
		Hitchen			
		Hythe			
		Hoddesden			
		Holbeach			
		Holmfirth £8880		3 10 0	
		Holyhead			
		Holywell (see British Provincial)			
		Honiton			
		Horncastle			
10		Houghton-le-Sprg.	10 0 0	8 0 0	
		Horsham			
		Howden			
		Hull, Sculcoats (see British Provin.)			
		Hull, £11,712. 10s.		5 0 0	
		Hunmanby			
210	10	Hungerford	10 0 0	5 0 0	10 0 0
		Huddersfield			
520	5	High Wycombe	5 0 0	6 0 0	5 0 0
		Ilminster			
		Ilford			
		Ilfracombe			
		Ironbridge			
1400	10	*Ipswich*	10 0 0	8 0 0	15 0 0
1400	10	„ new shares	7 10 0	8 0 0	
800	25	*Isle of Thanet* (Ramsgate&Mar.)	20 0 0	5 0 0	20 to 21
		Kendal £9100		8 15 0	
		Kenilworth			
		Keswick			
		Kettering	25 0 0	5 0 0	25 0 0
100	25	*Kiddermins.* £10000		5 0 0	
		King's Langley			
		Kington, Hereford			
		Kirkby Lonsdale			
		Kirkham, nr. Preston			
		Knutsford			
		Lancaster			
		Llanelly £3000		5 0 0	
		Llandovery			
		Leamington Priors £22,500		6 0 0	
		Leatherhead			
		Ledbury			
		Leeds Old Comp. old stk., £60,300		10 0 0	
		new „ £23,775		6 0 0	
		Leeds New £60,000		10 0 0	
		Leek			
		Leicester £36,230		7 0 0	
		Leigh			
125	20	Leighton Buzzard	20 0	5 0 0	
		Leominster			
		Leyburn, Yorksh.			
		Liskeard			
330	25	Lewes	25 0 0	5 0 0	23 0 0
		Lincoln £8000		10 0 0	
		Leyland, Lancash.			
		Littlehampton			
250	20	Lichfield	20 0 0	10 0 0	30 0 0
		Liverpool United	100 0 0	9 0 0	186 to 188
		„ ¼ sh.	25 0 0	9 0 0	46½ to 47
		Langport			
		London Comps.—			
5000	40	*British*	18 0 0	5 0 0	12 to 13
		„ debentures £46,300		4 0 0	
5000	20	„ Provincial— (Gloucester, Holywell, Hull, Norwich, Stoke, Trowbridg)	20 0 0	7 0 0	18½ to 19½
	20	„ Prov., new	8 0 0	7 0 0	5 to 7
	25	*Commercial*	25 0 0	6 0 0	23½ to 24½
	25	„ new shares	15 0 0	6 0 0	part to dis
	25	„ „	2 10 0	6 0 0	part to dis
12,000	50	*Chartered*	50 0 0	5 0 0	45 to 47
6000	50	„ new shares	10 0 0	6 0 0	9 to 9½
2000	150	*City of London*	150 0 0	4 0 0	125 to 130
4000	50	*Equitable*	50 0 0	2 10 0	29 to 30
		„ debentures £46,000			
10,000	20	European— (Amiens, Boulogne, Caen, Havre, Nantes, and Rouen)	20 0 0	5 0 0	13 to 14
	20	„ do. new	5 10 0	5 0 0	4 to 4½

Number of Shares issued	Amount per Shar	Name of Company.	Amount paid up per Share	Dividend per Cent. per Ann.	Price.
	£		£ s. d	£ s. d	£ s. d
15,000	10	Gt.Cntl.Consumers	10 0 0	5 0 0	
8000	50	*Impl.Continental*—(Amsterdam, Aix-la-Chapelle Antwerp, Berlin, Bordeaux, Brussels, Cologne, Frankft., Ghent, Haarlem Hanover, Lille, Marseilles, Rotterdam, Toulouse, Vienna)	42 0 0		40 to 45
7000	50	„ new shares	41 0 0		50 to 55
	50	„ third issue	42 10 0		40 to 45
10,000	50	*Imperial*	50 0 0	6 0 0	69 to 71
3000	50	„ new shares	35 0 0	6 0 0	50 to 52
		„ debentures £50,500			
4000	40	*Independent*	40 0 0	6 0 0	41 to 42
3000	50	*London*	50 0 0		7 to 9
6000	25	„ preference	7 10 0	6 0 0	7¾
3000	50	„ 2nd do.	50 0 0		18 to 20
9000	50	*Phœnix*	49 0 0	4 10 0	27 to 28
1000	100	*Ratcliff*	90 0 0	5 0 0	58 to 60
4000	25	*South Metrop.*	25 0 0	6 0 0	21½ to 22
9000	50	United General—(Cork, Dublin, Limerick)	50 0 0	2 0 0	14½ to 15¼
12,500	20	Western	18 0 0		7 0 0
		Lostwithiel			
		Loughborough			
240	25	*Louth*	25 0 0	6 0 0	26 10 0
		Lowestoft (see Beccles)			
611	5	Ludlow Union	5 0 0	6 0 0	5 0 0
		Luton			
		Lutterworth			
		Lyme Regis			
		Lymington			
		Malmesbury			
		Macclesfield 32,000		3 15 0	
		Maidenhead			
300	50	*Maidstone*	50 0 0	10 0 0	90 0 0
		Maldon			
		Marlborough			
		Malton (New)			
		Malvern			
		Manningtree			
		Mansfield £5000		10 0 0	
		March			
		Margate (see I. of T.			
		Market Deeping			
		Market Drayton			
132	25	Market Harboro'	25 0 0	6 0 0	30 0 0
		Market Raisin			
		Market Weighton			
		Marlow			
370	10	Maryport	10 0 0	6 0 0	12 0 0
		Melksham			
		Melton Mowbray			
		Merthyr Tydvil			
		Mere		5 0 0	
		Middleton £9032			
		MidsummerNorton			
		Middlesboro'			
		Mildenhall			
		Mitcham			
		Mold			
700	10	Monmouth	10 0 0	5 0 0	
		Monk Wearmouth			
		Moreton in Marsh			
		Morley			
		Mottram			
		Nantwich			
		Neath			
		Needham Market			
		Newark £5000		10 0 0	
250	20	Newbury	20 0 0	5 0 0	20 0 0
13,000	5	Newcastle & Gateshead Union	5 0 0	8 0 0	6 12 6
		Newcastle-under-Lyne £6200		4 0 0	
600	5	Newmarket	5 0 0	6 0 0	5 0 0
		Newnham, Glost.			
		Newent			
		New Mills & Hayfield £2115			
		Newport, M. £11720		8 0 0	
320	50	*Newport, Isle of W.*	38 0 0	4 0 0	19 to 20
		Newport Pagnell			
		Newport, Salop			
		Newton Abbot			
		Newton, Lanc.			
		Northallerton			
		North Walsham			
542	20	*Northampton*	18 0 0	10 0 0	27 0 0
		Northwich			
		Norwich (see British Pro. £40,000		7 0 0	
900	50	*Nottingham*	50 0 0	10 0 0	
900	50	New shares		10 0 0	
		Nuneaton			
		Oakham			
		Oakhampton			
200	10	Odiham, Hants	10 0 0	3 10 0	10 0 0
		Oldham			
		Olney			
		Ongar			
		Ormskirk			
		Otley, Yorkshire			
		Oundle			
		Oxford £18,000		9 10 0	
		Over Darwen £8000		5 0 0	
		Padstow			
		Pately Bridge, Yrk.			
250	20	Penrith	15 0 0	6 10 0	21 0 0
		Penryn			
		Penzance			
200	10	Petworth	10 0 0	8 0 0	12 0 0
		Petersfield			
		Pickering			
3000	10	*Plymouth*	10 0 0	6 0 0	11 0 0
		Pocklington			
		Pontefract			
		Pontypridd			
400	10	Poole	10 0 0	5 0 0	10 0 0
		Port Madoc			
600	50	*Portsea Island*	53 0 0	5 0 0	45 to 47
400	10	Prescott	9 0 0	4 13 4	7 0 0
		Preston £52,500		10 0 0	
		Pwllhelli			
		Pudsey £12,000		5 0 0	
		Radcliff and Pilkington £9000		4 12 10	
		Ramsay, I. of Man			
		Ramsgate (see Isle of Thanet)			
		Ravenglass			
1000	10	*Reading*	10 0 0	3 0 0	7 0 0
500	20	*Reading Union*	20 0 0	6 0 0	17 0 0
		Redditch			
		Redruth			
		Reigate			
		Retford (East)			
		Rhyl			
		Richmond (Surrey)			
		Ripon			
		Rochester and Chatham £20,000		6 0 0	
		Rochford			
		Rockingham			
		Romford			
		Ross			
245	25	*Rotherham*	25 0 0	6 0 0	40 10 0
		Royston			
		Ruabon			
		Rugby			
		Rugeley			
		Runcorn £11,000		7 10 0	
		Ruthin			
500	10	Ryde	10 0 0	6 0 0	12 0 0
		Rye			
		Romsey			
		Saddleworth			
225	20	Saffron Walden	20 0 0	3 15 0	19 0 0
		St. Austel			
		St. Asaph			
		St. Colomb			
		St. Helen's £7500		7 10 0	
		St. Helier's (Jersey)			
		St. Ives, Hunting.			
		St. Ives, Cornwall			
250	10	St. Neot's	10 0 0	8 0 0	12 0 0
		St. Peter's Port, (Guernsey)			
320	25	Salisbury	25 0 0	6 0 0	28 to 30
		Sandbach			
140	10	Saxmundham	10 0 0	5 0 0	10 0 0
		Scarborough			
		Seaham Harbour			
		Selby			
		Settle			
290	10	Sevenoaks	10 0 0	5 0 0	10 0 0
		Shaftesbury			
5400	25	*Sheffield United*	24 0 0	8 6 8	35 0 0
		Shelton, Potteries (see Brit. Prov.)			
		Shepton Mallet			
		Sherborne			
2914	5	Shields, North (Tynemouth)	5 0 0	3 0 0	5 0 0
		Shields (South)			
		Shiffnal, Salop			
1000	5	*Shipley*	5 0 0	6 0 0	5 19 6
		Shipston-on-Stour			
		Shoreham			
		Shrewsbury £10,000		7 0 0	
400	10	Skipton	10 0 0	4 0 0	11 0 0
250	10	Sleaford			
		Slough	10 0 0		
		Snaith			
		Soham			
		Southwold			
		South Molton			
1000	50	*Southampton*	32 0 0	5 0 0	
		Sowerby, Yorksh.			
		Stretford			
		Stokesly			
		Stafford £10,000		5 0 0	
		Staines and Egham			
		Staley Bridge £15,000		10 0 0	
		Stamford £11,250		3 0 0	
		Stockton-on-Tees £7980		9 5 0	
840	9½	Stockton, New	9 10 0	9 0 0	8 0 0
960	10	Stoke-upon-Trent	10 0 0	5 10 0	10 0 0
500	10	„ new shares	4 0 0	5 10 0	10 0 0
		Stone, Stafford			
		Stoney Stratford			
		Stourbridge			
		Stowmarket			
150	20	Stratford-on-Avon	20 0 0	7 10 0	30 0 0
		Stroud			
169	10	Swaffham	10 0 0	5 0 0	5 10 0
		Swansea £9000			
		Sudbury			
		Sunderland, old			
6400	5	*Sunderland*, new	5 0 0		
		Sutton			
		Swindon			
2800	5	*Taunton*	5 0 0	None	2 10 0
		Tadcaster			
		Tamworth			
		Tavistock			
		Teignmouth			
		Tenbury			
		Tenby			
		Tenterden £2000		2 10 0	
		Tetbury, Gloster			
		Tewkesbury			
		Thame			
		Thetford			
		Thirsk			
		Thornbury			
600	5	Cupar Angus	5 0 0	6 0 0	5 10 0
250	10	Cupar Fife	10 0 0	7 10 0	14 0 0
		Dalkeith			
		Dingwall			
		Dornoch			
		Douglas			
		Dumbarton			
400	20	Dumfries	14 0 0	5 0 0	20 0 0
		Dunbar			
		Dunblane			
		Dundee, old £29,687		4 4 0	
		Thorne			
		Tiverton			
670	5	Todmorden	3 0 0		
		Torquay			
		Torrington, Devon			
		Totnes			
		Totnes and Bridgetown Consumers			
4000	5	Tottenham	3 10 0	6 0 0	3 0 0
		Towcester			
		Tring			
		Trowbridge (see British Provin.)			
75	50	Truro	50 0 0	2 0 0	
		Tunbridge			
		Tunbridge Wells			
		Ulverston			
		Uppingham			
240	5	Upton-on-Severn	5 0 0	5 0 0	5 0 0
		Usk, Monmouth			
		Uttoxeter			
		Uxbridge			
1000	25	*Wakefield*, old capl	25 0 0	6 0 0	25 0 0
1600	5	„ new „	5 0 0	6 0 0	5 0 0
300	10	Wallingford	10 0 0	5 0 0	8 0 0
		Wandsworth			
		Wantage			
		Warrington £23304		10 0 0	
100	10	Wareham	10 0 0	3 10 0	8 0 0
120	25	Warminster	25 0 0	5 0 0	27 0 0
		Warth			
		Warwick £15,000		6 0 0	
		Watford			
		Welchpool, Mntgy.			
		Wellingborough			
		Wellington, Salop			
		Wellington, Smrst.			
		Wells, Smrst. £5000		7 10 0	
		Westbury			
		Weston-sup.-Mare			
2000	5	West Ham	5 0 0	6 0 0	5 0 0
		Whitby			
		Whitehaven			
		Whitstable			
		Whittlesea			
		Wigan £10,160		10 0 0	
		Willenhall			
		Winchelsea			
		Winslow			
240	10	Wimborne Minster	10 0 0		
		Wincanton			
360	50	Winchester	50 0 0	6 0 0	
900	12½	Windsor	12 10 0	10 0 0	23 0 0
		Witham			
		Witney			
4448	10	*Wolverhampton*	10 0 0	7 0 0	15 0 0
		Woburn			
210	10	Wokingham	10 0 0		10 0 0
		Woodbridge			
		Wooler			
		Wotton-un.-Edge			
		Worcester £29,000		8 0 0	
		Workington			
		Worksop and Radford			
		Wirksworth			
		Worthing			
		Wrexham			
		Woolwich			
		Woolwich Consms.			
		Woolwich (North)			
		Wymondham			
		Yarm			
795	20	Yarmouth	20 0 0		15½ to 16¼
		Yeadon, near Leeds			
		Yeovil			
		York Untd. £55,000		7 0 0	
		SCOTLAND.			
		Aberdeen			
		Airdrie			
		Alloa			
		Annan			
		Anstruther			
		Ardrossan			
550	20	Arbroath	20 0 0	7 10 0	7 10 0
		Auchterarder			
750	2	Auchtermuchty	2 0 0	6 0 0	2 10 0
		Ayr, old			
		Ditto, new			
		Banff			
		Barrhead			
		Bathgate			
		Beith			
		Bervie			
		Biggar			
		Blairgowrie			
350	6	Borrowstowness	6 0 0	5 0 0	8 0 0
		Brechin			
		Bridge of Allan			
		Broughty Ferry			
		Burntisland			
		Callen			
		Campbelton			
		Clackmannan			
		Coatbridge			
		Coldstream			
		Collinsburgh			
		Crieff			
		Crail, Fife			
		Cumbernauld			
		Cumnock			

Number of Shares issued.	Amount per Share	Name of Company.	Amount paid up per Share	Dividend per Cent. per Ann.	Price.
	£		£ s. d	£ s. d	£ s. d
		Dundee, nw £33,851		2 10 0	
860	10	Dunfermline	10 0 0	6 0 0	12 12 0
		Dunkeld			
		Dunse			
		Dysart			
6000	25	*Edinburgh Gas Co.*	25 0 0	10 0 0	45 0 0
		„ *and Leith Co.*			
		£98,640		6 10 0	
		Elie			
		Elgin			
		Falkirk, old			
		„ new			
		Falkland			
		Ferry Port on Craig			
		Fochabers			
		Forfar			
		Fort William			
		Fraserburgh			
		Galashiels			
		Garlieston			
		Gatehouse n. Fleet			
		Girvan			
		Glasgow £122,500		7 10 0	
15000	10	*Glasgow City and Suburban*	9 0 0	6 10 0	9 0 0
		Grangemouth			
		Grahamston			
		Haddington			
		Hamilton £7500		8 0 0	
		Hawick			
		Helensburgh			
		Huntly			
		Inverary			
400	1	Inverkeithing	1 0 0	5 0 0	1 0 0
1200	10	*Inverness Gas and Water*	10 0 0	5 10 0	15 0 0
2400	5	„ new shares	1 5 0	5 10 0	2 5 0
		Irvine			
		Jedburgh			
		Johnstone, near Paisley			
		Keith			
		Kelso			
		Kilmarnock			
		Kincardine			
		Kinghorn			
		Kingskittle, Fife			
		Kinross			
		Kirkaldy			
320	5	Kirkcudbright	5 0 0	5 0 0	5 0 0
1000	3	Kirkintulloch, near Glasgow	3 0 0	5 0 0	3 0 0
297	5	Kirkwall	5 0 0	5 0 0	4 10 0
518	5	Kirriemuir	5 0 0	6 0 0	
		Lanark			
		Largo, near Leven			
		Largs			
		Lasswade, n. Edin.			
		Lauder			
		Leith			
		Leslie, Fife			
		Lesmahago			
		Leven			
		Linlithgow			
		Linton, n. Nobleh.			
		Lochee, n. Dundee			
		Lochgilphead			
		Lochwinnock, near Paisley			
1200	1	Markinch	1 0 0	7 10 0	1 5 0
		Mauchline			
		Maxwell-town, n. Dumfries			
		Maybole, Ayrshire			
		Maryhill, near Glasgow			
		Melrose			
718	2	Mid & East Calder	2 0 0		2 0 0
192	5	Moffat	5 0 0		
	13½	Montrose	13 10 0	7 11 1	
		Musselburgh			
		Nairn			
		Neilston, n. Glasg.			
		Newmills, near Kilmarnock			
		Newburgh, Fife			
		Newton Stewart			
		North Berwick, n. Haddington			
		North Queensferry			
		Oban			
		Peebles			
800	25	Perth	25 0 0	4 16 0	22 10 0
		Peterhead			
		Pittenweem			
		Pollokshaws, near Glasgow			
		Port Glasgow			
		Portobello, near Edinburgh			
		Prestonpans			
		Rutherglen, near Glasgow			
		Renfrew, n. Paisley			
		Saltcoats			
		Sanquhar			
		Selkirk			
		South Queensferry			
		St. Andrew's			
		Stewarton			
		Stirling			
		Stoneheavn			
		Stonhouse, Lanrks.			
		Stornoway			
		Stranraer			
		Strathaven, near Hamilton			
		Thurso			
		Tillicoultry, n. Alloa			
800	1	Tranent	1 0 0		1 0 0
		Troon			
		Wick			
		Wigton			
		Wemyss	4 10 0		

IRELAND.

Number of Shares issued.	Amount per Share	Name of Company.	Amount paid up per Share	Dividend per Cent. per Ann.	Price.
	£		£ s. d	£ s. d	£ s. d
300	10	Armagh	10 0 0	8 0 0	14 10 0
		Ballinasloe			
700	50	*Belfast*	50 0 0		
		Ballymena			
		Ballymoney			
		Carrickfergus			
		Carlow, new			
		Cork (see Un. Gen.)			
		Clonmel Consumrs			
		Drogheda			
19,000	10	*Dublin Consumers*	5 0 0	7 0 0	6 0 0
		Dublin Hibernian (see United Gen.)			
160	25	Dundalk	25 0 0		22 0 0
		Dungannon			
1000	5	*Downpatrick*	5 0 0		
		Enniskillen			
		Galway			
400	10	Kilkenny	10 0 0	8 0 0	11 5 0
		Larne			
		Limerick (see U. G.)			
1725	5	Limerick Consum.	5 0 0	5 0 0	5 0 0
600	15	Londonderry	15 0 0	6 13 4	21 10 0
500	7	Lisburn	7 0 0	6 5 0	7 0 0
520	10	Lurgan	6 0 0	6 0 0	6 0 0
		Mallow			
		Monaghan			
		Nenagh			
448	5	Newtownards	5 0 0	4 0 0	5 0 0
		New Ross			
		Newry			
		Omagh			
125	20	Portadown	20 0 0	6 0 0	20 0 0
600	10	Sligo	10 0 0		
		Tipperary			
		Tralee			
		Waterford			
		Wexford			

The Gas Works in the undermentioned towns belong to private individuals:—

Abergavenny.	Ely.	Hertford.	Morpeth.	Sheerness.	Ware. (2 works)
Bridgenorth.	Farsley.	Holt.	Oswestry.	Sidmouth.	Wem.
Carlow, old.	Gainsborough.	Huntingdon.	Peterborough.	Sittingbourne.	Weymouth.
Carnarvon.	Goole.	Hyde (Cheshire)	Pontypool.	Spalding.	Whitchurch (Salop).
Deal.	Harleston.	Kingston-on-Thames.	St. Alban's.	Waltham Abbey.	Wisbeach.
Diss.	Hatfield.	Lynn.	Sandwich.		

The Gas Works belong to the Corporations, or to Commissioners acting under special acts of Parliament, in the following towns:—

Carlisle.	Keighly.	Milton (Kent).	Rothesay.	Southport (Lanc.)	Walsall.
Cashel.	Knaresborough.	Paisley.	Richmond (Yorkshire).	Stockport	Wells (Norfolk).
Coleraine.	Lytham (Lanc.)	Rochdale.	Salford.	Strabane.	Youghall.
Greenock.	Manchester.				

Price Current.

The following List of Prices is corrected by an eminent wholesale house in each trade up to the latest period:—

CASTINGS, per Ton.

Average Weight of Cast Iron Pipes, per Yard.

1½ in.	2 in.	2½ in.	3 in.	4 in.	5 in.	6 in.	7 in.	8 in.	9 in.	10 in.	12 in.
16	21	28	33	51	70	89	107	126	149	177	208 lbs.

Retail Prices are 5 to 10 per cent. higher.	London.	Glasgow	Newcastle.	Wales.	Yorksh., Derbysh. and Staffdsh
	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.
Pig Iron, No. 1.	3 7 6	2 10 0	3 0 0	3 15 0	3 10 0
1½ and 2 inches Socket Pipes	6 0 0	5 0 0	5 10 0	5 15 0	5 15 0
2½ and 3 do. do.	5 17 6	4 17 6	5 7 6	5 12 6	5 12 6
4 and 5 do. do.	5 15 0	4 15 0	5 5 0	5 10 0	5 10 0
6 inches and upwards do.	5 12 6	4 15 0	5 2 6	5 7 6	5 7 6
Extra for bends, branches, and connection	2 0 0	2 0 0	2 0 0	2 0 0	2 0 0
Retorts, 1st fusion	5 5 0	..	..	4 17 6	5 0 0
Do. 2nd fusion	5 15 0	4 10 0	4 17 6	5 5 0	5 5 0
Tank Plates, ¼ thick and above	5 10 0	4 17 6	5 0 0	5 7 6	5 17 6
Do. less than ¼	5 15 0	5 0 0	5 0 0	..	5 10 0
Plain Castings ex. models	5 15 0	5 0 0	5 0 0	5 10 0	5 10 0

COALS.

NEWCASTLE. Unscreened.	s. d.	DERBYSHIRE. Unscreened.	s. d.
Ravensworth Pelaw, Dean's Primrose	5 9 per ton.	Clay Cross, Deep Main, New Birchwood	6 6 per ton.
Pelton, Brancepeth, Medomsley, New Tanfield	6 0 „	SCOTCH CANNEL.	
Pelaw	6 3 „	Kirkness best	23 0 „
Eighton Moor, Felling Main, New Pelton, Pearth, South Pelaw, Waldridge, Washington Hutton, South Pearth	6 6 „	Boghead	21 0 „
		Capeldrae, first quality	20 0 „
		Ditto, second quality	10 0 „
		Lothian	18 0 „
		Lesmahago at Glasgow	16 6 „
		Ditto at Leith	18 0 „
		Wemyss	15 0 „
		Donibristle	10 6 „
		Bridgeness, Kinneil	11 0 „
Ramsay's Cannel	12 0 „	Lochgelly, Lumphinan	9 6 „
Cowen's Cannel	12 0 „		

FIRE GOODS.

Best Bricks, 50s. per 1000, at Newcastle.
Do. Clay, 12s. per ton do.

LEAD.

Soft pig, £18. 10s. per ton.

WROUGHT IRON TUBING, subject to 40 per cent. Discount.

	2 inches.	1½ inch.	1¼ inch.	1 inch.	¾ inch.	½ inch.
	s. d.	s. d.	s. d.	s. d.	s. d.	s. d.
Patent welded tubes, from 4 to 12 feet, per foot	1 8	1 0	0 10	0 7	0 5	0 4½
Ditto „ 2 to 4 feet	One penny		per foot extra.			
Ditto „ 6 in. to 18 in., each	3 0	2 0	1 9	1 3	1 0	0 9
Connecting pieces, or long screws	3 6	2 3	2 0	1 6	1 2	0 11
Bends, springs, and elbows, wrought iron	3 9	2 3	1 9	1 0	0 10	0 8
Tees, wrought or cast	4 0	2 6	2 0	1 6	1 1	0 10
Crosses, wrought or cast	4 6	3 0	2 6	2 0	1 6	1 2
Iron cocks	17 6	9 6	7 6	4 6	3 3	2 6
Ditto, with brass plug	28 0	16 0	13 0	7 0	5 6	4 6
Diminishing sockets, caps, plugs, and nipples	1 3	0 9	0 8	0 6	0 5	0 4
Plain sockets	1 0	0 8	0 7	0 5	0 4	0 3
Flanches	1 9	1 6	1 3	1 0	0 9	
Syphons, 2 quart	15 0	14 0	13 6	13 0	12 0	

FREIGHTS, per Ton.

Coastwise—Newcastle.	s. d.		s. d.
Chatham & Roches.	5 6	Weymouth	6 9
Cork	8 0	Yarmouth	4 6
Dover	5 6	*Foreign.*	
Dublin	8 0	Amsterdam	8 0
Exeter Quay	7 3	Boulogne	6 6
Folkestone	5 9	Barcelona	17 0
Hastings	6 9	Bordeaux	10 0
Ipswich	5 0	Calais	6 9
Jersey	7 0	Dieppe	7 3
London	5 3	Hamburg	6 9
Lowestoft	4 6	Havre	8 0
Lynn	5 9	Lisbon	10 0
Margate	6 0	Rotterdam	6 9
Portsmouth	6 6	Rouen	10 6
Plymouth	6 6	St. Petersburgh	10 6
Southampton	6 3	Stettin	8 6
		Trieste and Venice	21 0